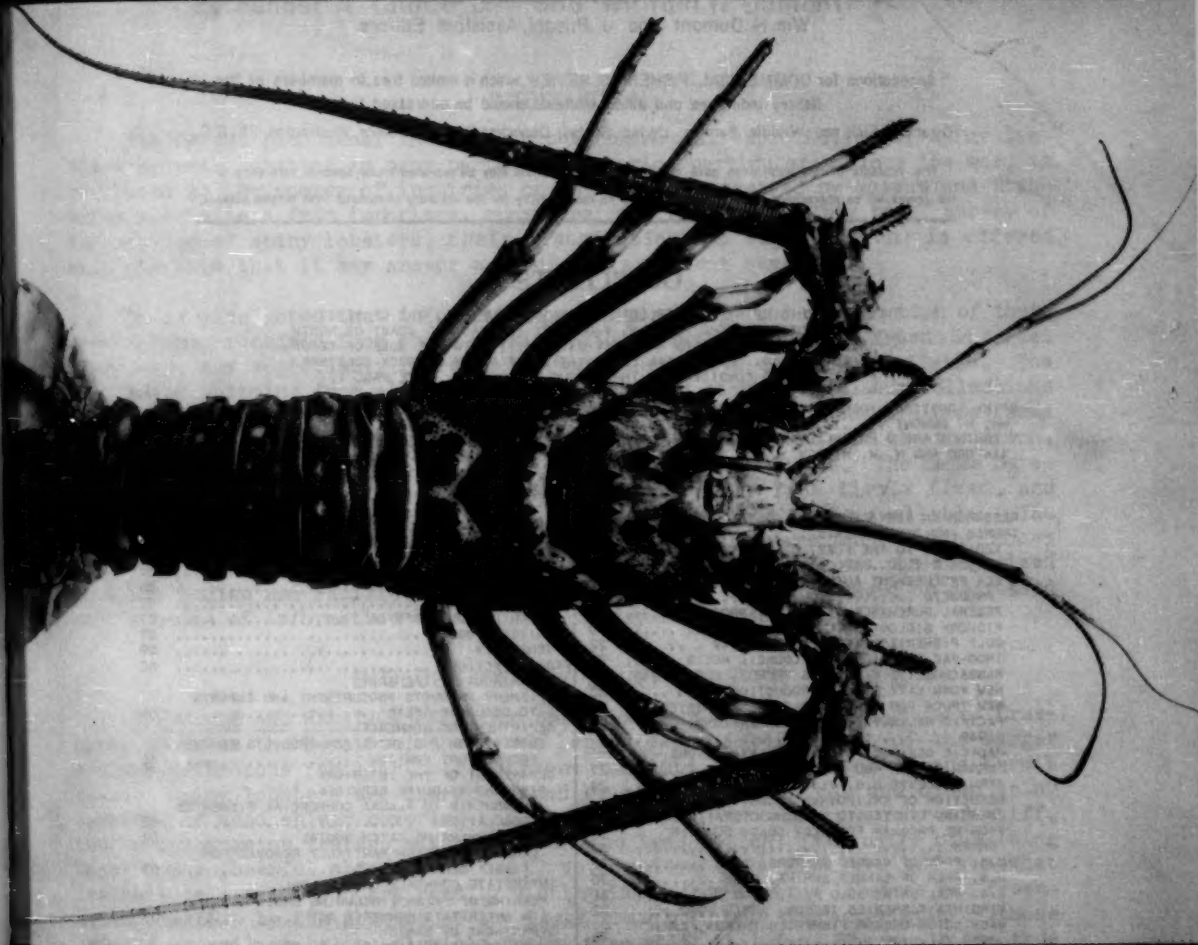


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# COMMERCIAL FISHERIES REVIEW



VOL. 11, No. 5

MAY 1949

FISH and WILDLIFE SERVICE  
United States Department of the Interior  
Washington, D.C.



## COMMERCIAL FISHERIES REVIEW



A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES  
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

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## SPINY LOBSTERS--IDENTIFICATION, WORLD DISTRIBUTION, AND U.S. TRADE

By Fenner A. Chace, Jr.\* and William H. Dumont\*\*

### INTRODUCTION

The recent phenomenal increase in the commercial exploitation of spiny lobsters or rock lobsters in many parts of the world, particularly since the war, is reflected in the number of inquiries on the subject received by museum and fisheries specialists from importers, consumers, and fishermen. This brief survey of the species of spiny lobsters, their distribution and exploitation, is offered with the hope that it may answer some of the prevalent questions.

It is also hoped that information on the morphology and distribution of these crustaceans, received from those working with extensive series of fresh and frozen specimens, may appreciably increase the very incomplete data now available. The problem of shipping from all parts of the world and storing in museum collections specimens as large as adult spiny lobsters has curtailed the study of these forms to such an extent in the past that we know altogether too little of the variation, interrelation, and geographic distribution of many of the species. The names herein assigned to several of the species are therefore far from firmly fixed, and they may have to be replaced by others when additional data are available. The species from both sides of the North and South Atlantic are much better known than those from the Indo-Pacific region. Even the number of forms now recognized from the Indian and Pacific Oceans will probably have to be increased or decreased on the basis of information which will some day be accessible.

### BIOLOGY OF THE SPINY LOBSTER

**STRUCTURE AND RELATIONSHIP:** The spiny lobsters belong to that group of Crustacea known as the Decapoda; these ten-legged forms include most of the larger shelled arthropods familiar to fishermen: shrimps, lobsters, crabs and hermit crabs. Spiny lobsters are characterized by a large, inflated, and often spiny carapace or head shield covering the forward part of the body; a pair of stiff, thorny antennae or feelers extending from the head region; five pairs of walking legs; and a powerful abdomen, or tail, terminating in a flexible and somewhat leathery tail fan. They are readily distinguished from the true lobsters and freshwater crayfish by the absence of the large crushing claws characteristic of those animals as well as by the flexible rather than stiff tail fan. Whereas in the true lobsters the claws yield a considerable part of the edible flesh, the chief portion of the spiny lobster that is usually eaten is the muscular tail, and it is only this part of the animal that is normally seen by the distributor and consumer (Figure 1).

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**SEX:** The sexes of entire spiny lobsters can be distinguished easily by the form of the fifth or last walking leg. In the males, this leg ends in a single simple claw like those in front of it; in the female, on the other hand, it terminates in a pair of pincers which are used in caring for the eggs attached to the under surface of the tail.

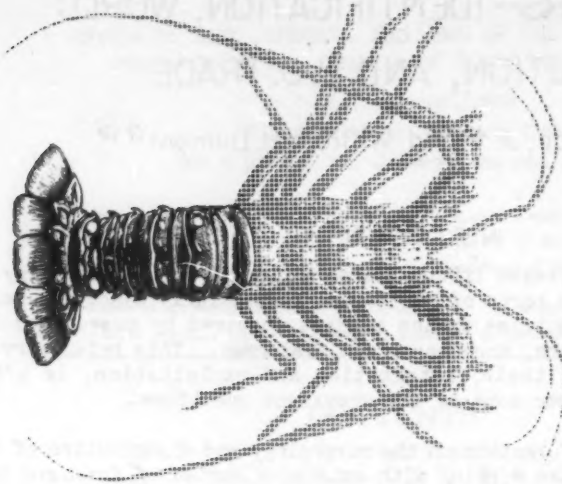


FIGURE 1 - SPINY LOBSTER (*PANULIRUS ARGUS*)

When the tail alone is available, the sexes can still be separated with little difficulty. In the males, the swimming legs on the under surface of the tail end in a single leaf-like joint. In the females, these legs end in two branches, both of those on the first pair being leaf-like, while the inner branch on the following legs is a rod-like joint to which the eggs are attached in berried specimens. Inasmuch as males are usually larger than females, the former are

likely to be more abundant in catches; fishermen usually prefer to fish those areas where the larger males are most common.

**GROWTH, SIZE, AND AGE:** The young spiny lobster goes through a series of peculiar larval stages before it settles to the bottom in its final form. The most peculiar and characteristic of these stages is the so-called phyllosoma stage. At this stage the young spiny lobster has the form of an extremely thin, flat, roughly circular, transparent disc somewhat more than an inch in diameter with eyes and legs protruding from the margins. After being carried about by currents near the sea surface, the young lobster undergoes a couple of moults and finally emerges on the ocean floor as a very small replica of its adult form. From this stage on, the spiny lobster grows by slow stages, shedding the shell and growing a slightly larger one periodically. There is little reliable information on the age of the various species at marketable size, and it is obvious that the rate of growth will vary somewhat with the food supply and the temperature of the water. From the meager data available, it is probable that females reach sexual maturity at a total length of four or five inches and an age of about three years, while males are not sexually mature until they are about nine inches long and correspondingly older. It is not improbable, therefore, that marketable specimens are upwards of five years old.

**FOOD:** Spiny lobsters are omnivorous feeders, eating practically any animal food they can find or capture and even occasionally ingesting seaweeds. Their normal food probably includes marine worms, mollusks, smaller crustaceans, and dead and dying organisms of all kinds. Although they are scavengers to a degree, experiments have shown that they prefer fresh to putrid food; traps baited with decaying meat or fish have sometimes been less effective than unbaited ones.



**DISTRIBUTION:** The various species of spiny lobsters are found throughout the tropical and subtropical seas of the world, as well as in certain temperate regions (Figure 2). It should not be assumed that they will be encountered in all parts of the shaded areas shown on the accompanying chart, but it is probable

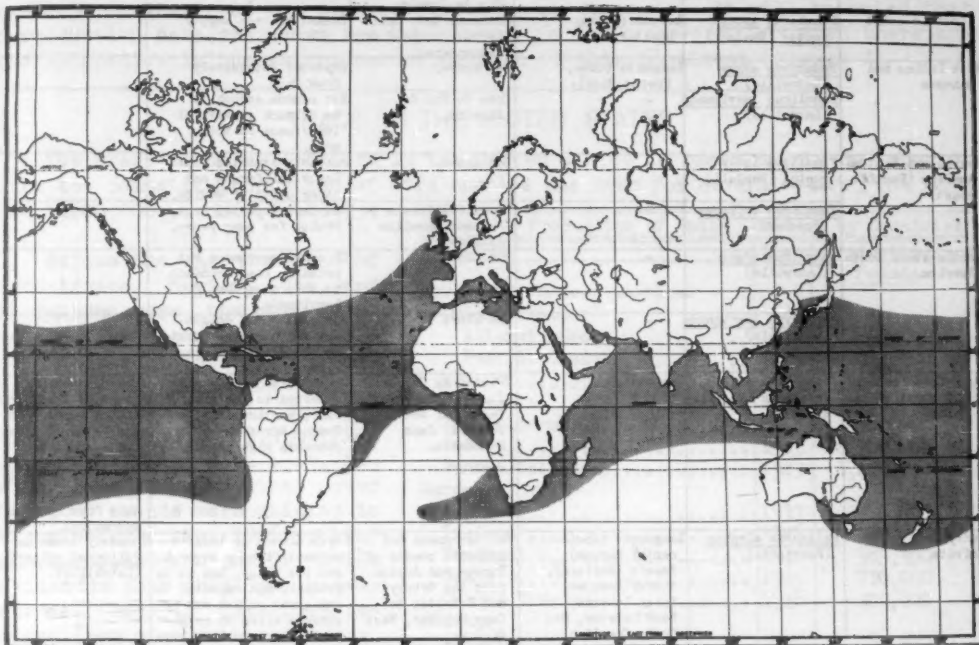


FIGURE 2 - THE DISTRIBUTION OF SPINY LOBSTERS (*PALINURIDAE*)

that they occur along most coasts in that zone wherever food is available and rocks or reefs are present to form suitable retreats. Although the adult spiny lobsters may migrate from place to place to a certain extent—sometimes covering considerable distances in a short time—their widespread distribution is largely accounted for by the dispersal of the pelagic larvae by ocean currents. Most of the species occur in tropical seas, but it is interesting to note that the form which is confined to the temperate regions of the southern hemisphere, *Jasus lalandei lalandei* (together with the subspecies *J. lalandei frontalis*), is the one that has formed the basis for much of the commercial exploitation up to the present time; it supports extensive fisheries in South Africa, South Australia, New Zealand, and Juan Fernandez. It is very possible that the increased demand for lobster tails will result in the early development of fisheries in areas not now fished commercially.

#### WORLD PRODUCTION

The known species of spiny lobster which are now of economic importance throughout the world are listed in Table 1. Besides the geographic distribution, the scientific and common names and importance in commercial trade is indicated.

Data on production of spiny lobsters for many countries where they are used as food are not available as the catch figures for these crustaceans are not shown

Table 1 - Spiny Lobsters (*Palinuridae*) of Economic Importance

Geographic Region	Species	Common Name	Distribution	Economic Importance	Remarks
United States: Atlantic coast	<i>Panulirus argus</i> (Latreille)	Spiny Lobster; Crawfish; Sea Crawfish; etc.	Bermudas, Bahamas, West Indies, and Atlantic and Gulf coasts of America from Florida to Rio de Janeiro.	Demand greatly exceeds supply.	
Pacific coast	<i>Panulirus interruptus</i> (Randall)	Lobster; Spiny Lobster	Monterey Bay, California, to Gulf of Tehuantepec.	Demand exceeds supply.	
West Indies and Bahamas	<i>Panulirus argus</i> (Latreille)	Langosta (Cuba, Puerto Rico).	See above.	Exported extensively from Cuba.	
	<i>Panulirus laevis</i> (Latreille)	-	Cuba to Rio de Janeiro.	Not common enough to be of much commercial importance in this area.	
Mexico and Central America (Pacific coast)	<i>Panulirus interruptus</i> (Randall)	-	See above.	Probably exported from Lower California and other parts of Mexico.	
	<i>Panulirus inflatus</i> (Bouvier)	-	Lower California to Panama; Hawaiian Islands.	Has been exported from Mexico for many years.	
Northeastern South America	<i>Panulirus argus</i> (Latreille)	-	See above.	Of some importance but probably less abundant in this area than <i>P. laevis</i> .	
	<i>Panulirus laevis</i> (Latreille)	-	See above.	Apparently the commonest of the three species caught along the Brazilian coast.	
Juan Fernandez (off coast of Chile)	<i>Jaques lalandei</i> frontalis (H. Milne Edwards)	Langosta.	Tristan da Cunha; St. Paul Is.; Tasmania; New Zealand; Juan Fernandez.	Caught extensively and exported to the mainland, particularly to Buenos Aires where it commands high prices.	Although very distinct at the limits of its range, from the South African and Australian forms, <i>J. lalandei</i> is not yet certain that this form is a valid subspecies.
Europe and North Africa	<i>Palinurus elephas</i> (Fabricius)	Langouste (Continental Europe); Kreeft (Holland); Thorny Lobster, Spiny Lobster, Rock Lobster, Red Crab, Crawfish, Long Oyster (British Isles).	Mediterranean and Atlantic coasts of Europe and Africa from the Orkneys and Hebrides to Cape Bojador, West Africa.	Forms a more or less important fishery throughout its range, but it is probably not exported to any great extent and is shipped alive to neighboring markets from live cars, in which the spiny lobsters may be kept for two or three months.	Formerly known as <i>Palinurus vulgaris</i> (Latreille).
West and South Africa	<i>Jaques lalandei</i> lalandei (H. Milne Edwards)	Cape Crawfish, Crayfish; Kreeft; Kreeft.	Cape Cross, West Africa, to Algoa Bay, South Africa; southeast Australia from Pt. Stephen, New South Wales, to Reevesby Is., South Australia.	Very common and forming an important fishery in the vicinity of Capetown, as well as at two large canneries at Houtbay and Houtgebay in Sandanah Bay. Exported both canned and frozen to Europe and America.	
	<i>Panulirus rissoni</i> (Desmarest)	Royal Langouste (France)	Western Mediterranean; west coast of Africa from Cape Barbas to Mossamedes and Praya Amélia, Angola; Cape Verde Islands.	Caught by French boats and brought into French markets where it is well known and esteemed despite attempted boycott.	Formerly known as <i>Panulirus regius</i> (Brito Capello).
Indo-Pacific Region	<i>Panulirus japonicus</i> (Von Siebold)	Spiny Lobster (Japanese authors).	East Africa to Japan; Polynesia.	This species does not seem to attain a large size, but it is used by the Japanese in preserves as well as fresh; it is of considerable commercial importance along the southeast coasts of the main islands of Japan.	
	<i>Panulirus polyphagus</i> (Herbst)	-	Mauritius and India; Malay Archipelago; Indochina; Japan; Polynesia.	This species seems to be the only one of commercial importance in the Calcutta area.	Frequently referred to as <i>Panulirus fasciatus</i> (Fabricius).
	<i>Panulirus ornatus</i> (Fabricius)	-	Red Sea and South Africa to Forcosia and Polynesia.	Said to be very common on the coast of Madagascar, where it is sold to Europeans but never eaten by the natives.	
Australia	<i>Jaques lalandei</i> lalandei (H. Milne Edwards)	-	See above.	Exported in large quantity to the United States.	
	<i>Jaques verreauxi</i> (H. Milne Edwards)	Sydney Crawfish.	New South Wales; Tasmania; New Zealand.	The common form in the markets of Sydney; it is shipped alive to other Australian cities.	Formerly referred to as <i>Palinurus hügelii</i> (Heller).
Tasmania and New Zealand	<i>Jaques lalandei</i> frontalis (H. Milne Edwards)	Crayfish.	See above.	Caught in considerable numbers in New Zealand and exported in some quantity to the United States.	See above.

separately. Some idea of the production is possible, however, from the exports for some of those countries. While Table 2 is based on data from the FAO Yearbook of Fisheries Statistics, 1947, as well as consular reports of the State Department, it does not necessarily show the potential production for many countries which have not yet developed the fishery for these crustaceans. It will be noted that no production data are shown for any country in South America, although there are several species in the waters bordering part of this continent (Figure 2).

### TRADE IN THE UNITED STATES

The trade in spiny lobsters in the United States is based mainly on imports, since the domestic production of this species has been for several years, not more than 1,000,000 pounds (Table 3).

Before the war, the Union of South Africa, Mexico, Cuba, and the Bahamas were the only shippers of fresh and frozen "lobsters" (spiny lobster). The imports reached a maximum of 5.6 million pounds in 1941. By 1945, this dropped to around 3.3 million pounds. Starting with 1946, imports increased so that over 6,000,000 pounds were shipped to this country during 1946 and 1947 and 7,755,000 pounds in 1948. Besides the four principal prewar sources, imports have been received from nine other countries. Australia, within the past year, has entered the export market with frozen spiny lobster tails and is now in fourth position as shipper to this country. The large proportion of the imports of frozen spiny lobster tails has been from South Africa and Australia, with some from Cuba and the Bahamas. Whole spiny lobsters—live, boiled, and iced—are imported from nearby islands and countries. The import data do not separate the tails from whole spiny lobsters. However, it is known that all the imports from the Union of South Africa, Australia, and New Zealand are tails. As the tail represents about one-third of the live animal, the imports from these three countries, although only 40 percent of the total import weight, represent nearly 10,000,000 pounds of live spiny lobsters, or over two times the combined imports from all the countries of the western hemisphere.

The South African tails are generally individually wrapped in cellophane before freezing. After grading into sizes, they are packed in flat slat boxes, holding 20 pounds each. The sizes are:  $\frac{1}{2}$ -pound to  $\frac{3}{4}$ -pound;  $\frac{3}{4}$ -pound to 1-pound; and over 1-pound.

Table 2 - Production of Spiny Lobsters by Countries

Country	Year	Production Pounds
<b>North and Central America:</b>		
<b>United States:</b>		
Atlantic Coast .....	1944	463,000
Pacific Coast .....	1944	513,000
Mexico .....	1947	3,000,000
Guatemala .....	1947	200,000
Br. Honduras .....	1947	700,000
Cuba .....	1945	6,700,000
Bahama Islands .....	1947	1,400,000
<b>Europe:</b>		
France .....	1937	710,000
Ireland .....	1946	30,000
Portugal .....	1944	383,500
Spain .....	1946	720,000
United Kingdom .....	1946	400,000
<b>Africa:</b>		
Algeria .....	1940	62,500
Fr. Morocco .....	1938	66,000
Tunisia .....	1939	40,000
Union of So. Africa and Southwest Africa .....	1947	25,000,000 <sup>1/</sup>
Mauritius .....	1947	50,400
Australia .....	1946	4,577,000
New Zealand .....	1947	1,985,700
Japan .....	1946	4,850,000

<sup>1/</sup>Production limited by Union of South Africa to 6,000,000 lbs. of tails for canning or freezing for export. This is equivalent to 18 million lbs. of whole spiny lobsters. Local consumption is around 2 million lbs., while the production in Southwest Africa is estimated to be around 5 million lbs.

The shipment of fresh, frozen, and cooked spiny lobsters from Mexico, Cuba, and the Bahamas is dependent on the legal seasons in those countries. The large

**Table 3 - U. S. Imports of Fresh, Frozen & Cooked Spiny Lobsters (Whole and "Tails")**

Country of Origin	1948	1947	1946	1945
	Lbs.	Lbs.	Lbs.	Lbs.
Mexico .....	2,052,491	1,920,442	1,671,234	1,072,935
Honduras .....	6,606	-	-	-
Br. Honduras .....	136,264	157,538	79,220	-
Nicaragua .....	406	-	-	-
Bahamas .....	1,197,821	1,371,701	1,271,677	1,487,634
Cuba .....	1,150,792	425,201	250,100	353,881
Jamaica .....	7,150	53,376	-	-
Leeward Islands .....	2,085	13,587	3,500	-
Curacao .....	-	1,878	-	-
Fr. W. Indies .....	-	7,040	7,004	-
Australia .....	514,290	97,482	-	-
New Zealand .....	30,410	29,256	-	-
Union of So. Africa ...	2,657,178	2,236,780	2,564,345	433,600
Total .....	7,755,493	6,314,281	6,847,080	3,348,050

proportion of the imports from Mexico are shipped during the months of November to March (Table 4). The season for the Bahamas runs from October to March, while Cuba's shipping period is longer—July to December with smaller amounts coming in during January, February, and March. Shipments of frozen spiny lobster tails from South Africa may be made throughout

the year. The bulk of the shipments were made from December to May in 1947, but in 1948, there was no outstanding month.

In prewar years, over 400,000 pounds of canned spiny lobster meat from Cuba, Union of South Africa, and the British West Indies were imported into the United

**Table 4 - Monthly Index of U. S. Imports of Spiny Lobster Tails (From the Principal Countries)**

Country From Which Imported	Quantity Imported in 1948 (lbs.)	Percent Received per Month, 1948												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Mexico .....	2,082,491	22	26	14	1	1	1	1	1	1	2	12	18	100
Br. Honduras ...	136,264	20	1	-	2	12	-	3	-	-	12	44	6	100
Bahamas .....	1,197,821	7	19	16	3	-	-	-	-	-	9	28	18	100
Cuba .....	1,150,892	2	4	5	1	4	5	8	9	10	19	17	16	100
New Zealand ....	30,410	3	-	13	-	1	-	-	7	20	-	56	-	100
Australia .....	514,290	-	-	38	7	4	21	-	-	21	-	1	8	100
Union of So. Africa .....	2,657,178	-	16	11	6	10	-	15	1	10	5	13	13	100
Total .....	7,755,593	7	16	13	4	5	2	7	2	7	7	15	15	100

Note: Honduras, Nicaragua, Jamaica, and Leeward Islands were not included in the index since their shipments were insignificant.

States. During 1945 and 1946, Cuba was the only shipper and exported to the United States over 450,000 pounds of canned meat. The imports dropped drastically in 1947 when only 136,509 pounds of spiny lobster meat entered this country. However, imports for 1948 were over two times the 1945 imports and amounted to 1,037,710 pounds, with South Africa again assuming the position of the leading country. Small quantities were shipped from New Zealand, Guatemala, and China (Table 5).

**Table 5 - U. S. Imports of Canned Spiny Lobster Meat**

Country of Origin	1948	1947	1946	1945
	Lbs.	Lbs.	Lbs.	Lbs.
Cuba .....	294,546	122,359	461,529	459,375
Guatemala .....	1,238	-	-	-
New Zealand .....	19,175	12,825	-	-
Union of So. Africa .....	722,151	1,325	-	-
China .....	600	-	-	-
Total .....	1,037,710	136,509	461,529	459,375



Since the tail of the spiny lobster (Figure 1) is often the only part seen in the wholesale and retail markets in many sections of the United States, a key to identify the tails has been worked up.

### IDENTIFICATION OF SPINY TAILS

The following tentative key to the identification of spiny lobster tails may be of assistance to the commercial fishing industry in determining the area from which a particular shipment of fresh or frozen tails was exported. Inasmuch as it is subject to the errors and limitations mentioned above in the introductory remarks, the key should be used with some caution.

Included in this key are all the species of spiny lobsters usually recognized today, with the exception of those of the genus Puerulus; the identification of the latter from tails alone is impractical, and the four known forms are not sufficiently common to be of commercial importance. Most of the species covered here will never be encountered in commercial catches because of their rarity. They are included only because one or two of these scarce forms might appear in a shipment and give a clue to the original locality not provided by the predominant species. For instance, there is no simple way of distinguishing a shipment of Jasus lalandei lalandei from South Africa from a lot of the same form from Australia. If, however, a tail of Panulirus homarus (a South African species) or of Jasus verreauxi (an Australian form) happened to be included, the exporting country could be determined with some assurance.

For the benefit of those unfamiliar with taxonomic keys of this kind, the following remarks are offered. It will be seen that the key is composed of numbered couplets of more or less contradictory statements. To identify a particular spiny lobster tail, one begins with the first couplet and selects the statement which describes the specimen at hand. Proceed to the couplet number indicated at the end of the appropriate statement and continue in the same manner until a species name is reached. The numbers in parentheses indicate the previous couplet used in each case so that, when it is obvious that the wrong choice has been made at some point, steps can be retraced to the questionable couplet without starting at the beginning once more.

The authors are well aware of the presence of errors and deficiencies in this key. Changes suggested by those using it will be gratefully received. Such corrections and additions, based on the examination of much more material than can be accommodated in even the larger museum collections, can materially advance our meager knowledge of the systematic relationship and distribution of spiny lobsters.

#### TENTATIVE KEY TO THE TAILS OF SPINY LOBSTERS (PALINURIDAE) WITH THE EXCEPTION OF THE GENUS PUERULUS

Species marked (\*) are known to be of commercial importance (see Table 1).

Species marked (+) are probably of some commercial importance because of their size and abundance, although definite confirmation is lacking.

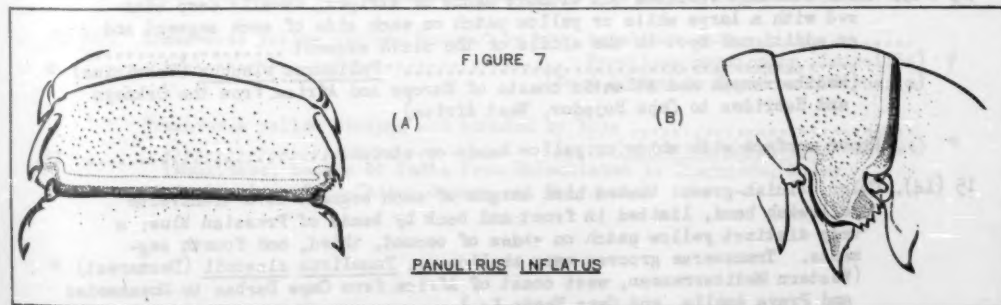
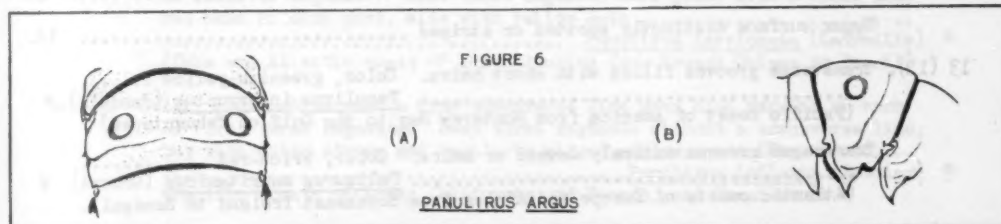
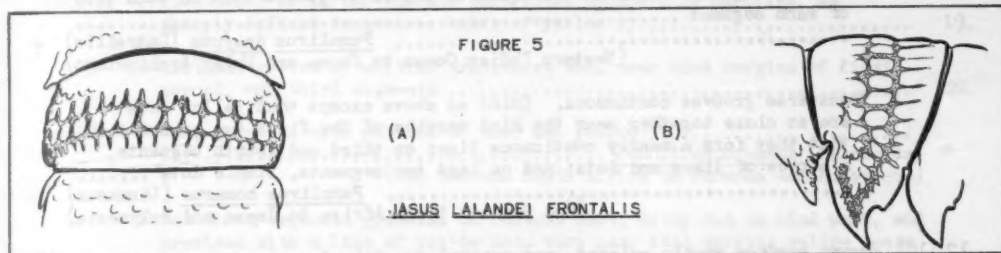
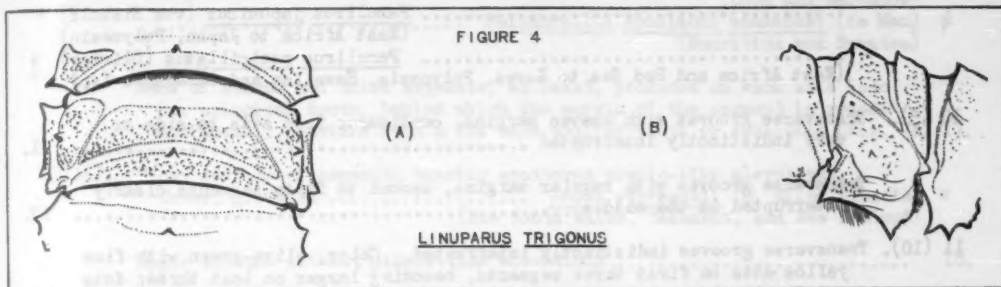
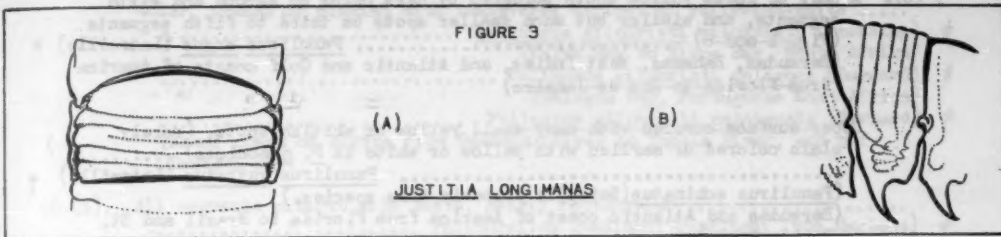
Species marked (#) are probably of no commercial importance because of their small size or rarity.

1. One or more transverse grooves on each of first five segments ..... 2.

No transverse grooves on any segments (Fig. 7a) ..... 16.

1/Identification of this species from the tails alone is impractical.

- 2 (1). Four transverse grooves on second to fifth segments (Fig. 3a). Each segment produced on each side into one well-developed tooth and, behind it, a shorter one which may have a few very small teeth or denticles on the hind margin (Fig. 3b). Color, brick red with yellowish stripes and dots ..... Justitia longimana longimana (H. Milne Edwards) #  
 ..... (West Indies) #  
 ..... Justitia longimana mauritiana (Miers) #  
 ..... (Mauritius) #
- Not more than one or two transverse grooves on second to fifth segments ... 3.
- 3 (2). Two transverse grooves on second to fifth segments, forward groove of each segment continuous from side to side, the hind one interrupted in the middle. Each segment produced on each side into two curved teeth, the forward one being the larger. Color, reddish to yellowish-brown ..... Palinustus truncatus (H. Milne Edwards) #  
 ..... (West Indies) #  
 ..... Palinustus mosambicus (Barnard) #  
 ..... (Portuguese East Africa and Sulu Sea)
- Only one transverse groove on each of first five segments (Fig. 4)..... 4.
- 4 (3). Each segment provided on each side with three nearly equal teeth and one or two smaller ones behind them (Fig. 4b). A lengthwise ridge at middle of each segment (Fig. 4a). Transverse grooves on first to third segments continuous from side to side, those on the other segments interrupted by the ridge. Color, yellowish with brick-red tint on the upper surface ... Limparus trigonus (von Siebold) #  
 ..... (Japan, Formosa)
- Each segment produced on each side into not more than two principal teeth, often with much smaller teeth or denticles behind them ..... 5.
- 5 (4). Each segment produced on each side into two principal unequal teeth (Fig. 5b) ..... 6.
- Each segment produced on each side into one principal tooth, behind which the margin of the segment is rounded and often provided with several much smaller teeth or denticles (Fig. 7b) ..... 10.
- 6 (5). Upper surface more or less covered with prominent scale-like ornamentations (Fig. 5a). Color, reddish-brown ..... 7.
- Upper surface largely smooth, without scale-like ornamentation ..... 8.
- 7 (6). Scale-like ornamentation covering nearly all of upper surface except in the transverse grooves ..... Jasus lalandei lalandei (H. Milne Edwards) \*  
 ..... (Cape Cross (West Africa) to Algoa Bay (South Africa) and southeast coast of Australia from Pt. Stephen (New South Wales) to Reevesby Is. (South Australia))
- Broad, smooth regions devoid of scale-like ornamentation along forward and hind margins of each segment and on entire forward half of first segment (Fig. 5) ..... Jasus lalandei frontalis (H. Milne Edwards) \*  
 ..... (Juan Fernandez, New Zealand, Tasmania, St. Paul Is., and Tristan da Cunha)
- 8 (6). Color reddish or plum-colored with a broad yellow transverse band on each segment in the region of the transverse groove ..... Pamulirus japonicus marginatus (Quoy & Gaimard) †  
 ..... (Hawaiian Islands)
- Upper surface without stripes, usually spotted, occasionally plain ..... 9.



- 9 (8). A pair of large yellow spots bordered by dark color on second and sixth segments, and similar but much smaller spots on third to fifth segments (Fig. 1 and 6) ..... Panulirus argus (Latreille) \*  
(Bermudas, Bahamas, West Indies, and Atlantic and Gulf coasts of America from Florida to Rio de Janeiro)
- Upper surface covered with many small yellow or whitish spots, (rarely plain colored or marbled with yellow or white in P. japonicus) .....  
(Panulirus echinatus (Smith) is probably this species.) ..... Panulirus guttatus (Latreille) †  
(Bermudas and Atlantic coast of America from Florida to Brazil and St. Paul's Rocks)
- ..... Panulirus japonicus (von Siebold) \*  
(East Africa to Japan, Polynesia)  
..... Panulirus penicillatus (Olivier) †  
(East Africa and Red Sea to Korea, Polynesia, Hawaiian and Galapagos Is.)
- 10 (5). Transverse grooves with uneven margins, continuous from side to side or very indistinctly interrupted ..... 11.
- Transverse grooves with regular margins, second to fifth segments clearly interrupted in the middle ..... 12.
- 11 (10). Transverse grooves indistinctly interrupted. Color, olive-green with fine yellow dots on first three segments, becoming larger on last three; dots not forming lines near hind margins of segments; yellow spot on each side of each segment .....  
..... Panulirus dasyptus (Latreille) †  
(Western Indian Ocean to Japan and Malay Archipelago)
- Transverse grooves continuous. Color as above except that yellow dots are so close together near the hind margins of the first two segments that they form a nearly continuous line; on third and fourth segments, a series of lines and dots; and on last two segments, simple dots .....  
..... Panulirus homarus (Linnaeus) †  
(Red Sea and South Africa to Japan and Polynesia)
- 12 (10). Upper surface evenly colored, not spotted or striped ..... 13.
- Upper surface distinctly spotted or striped ..... 14.
- 13 (12). Transverse grooves filled with short hairs. Color, greenish-yellow .....  
..... Panulirus interruptus (Randall) \*  
(Pacific coast of America from Monterey Bay to the Gulf of Tehuantepec)
- Transverse grooves entirely devoid of hairs. Color, brick-red .....  
..... Panulirus mauritanicus (Gruvel) †  
(Atlantic coasts of Europe and Africa from Southeast Ireland to Senegal)
- 14 (12). Color somewhat variable but without bands or stripes, usually deep wine-red with a large white or yellow patch on each side of each segment and an additional spot in the middle of the sixth segment .....  
..... Panulirus elephas (Fabricius) \*  
(Mediterranean and Atlantic coasts of Europe and Africa from the Orkneys and Hebrides to Cape Bojador, West Africa)
- Upper surface with white or yellow bands or stripes ..... 15.
- 15 (14). Color, bluish-green; toward hind margin of each segment is a transverse yellowish band, limited in front and back by bands of Prussian blue; a very distinct yellow patch on sides of second, third, and fourth segments. Transverse grooves very shallow ... Panulirus rissonii (Desmarest) \*  
(Western Mediterranean, west coast of Africa from Cape Barbas to Mossamedes and Praya Amelia, and Cape Verde Is.)



- Color, orange or pinkish with transverse stripes of yellowish-white ..... #  
 ..... Palinurus gilchristi gilchristi (Stebbing)  
 (False Bay to Algoa Bay, South Africa)  
 ..... Palinurus gilchristi delagoae (Barnard) #  
 (Delagoa Bay, Portuguese East Africa)  
 ..... Palinurus gilchristi natalensis (Barnard) +  
 (Natal coast of Africa from Umkomaas River to Tugela River, and off  
 Delagoa Bay)
- 16 (1). All segments without side teeth, nearly rectangular .....  
 ..... Palinurellus gundlachi gundlachi (von Martens) #  
 (Cuba and Barbados)  
 ..... Palinurellus gundlachi wienckeii (de Man) #  
 (Mauritius and Sumatra)
- Each of second and third segments, at least, produced on each side into  
 one principal tooth, behind which the margin of the segment is rounded  
 and usually provided with a few much smaller teeth or denticles (Fig. 7b) 17.
- 17(16). Upper surface of segments bearing scattered pimple-like elevations.  
 Color, greenish ..... Jasus verreauxii (H. Milne Edwards) \*  
 (New South Wales, Tasmania, and New Zealand)
- Upper surface without pimple-like elevations ..... 18.
- 18(17). Yellow color on dorsal surface restricted to spots or marbling, no  
 sharply defined transverse bands of yellow ..... 19.
- A distinct yellow or whitish transverse band near hind margins of first,  
 second, and third segments ..... 20.
- 19(18). Color, greenish with patches of blue and yellow .....  
 ..... Panulirus ornatus (Fabricius) \*  
 (Red Sea and South Africa to Formosa and Polynesia)
- First three segments greenish on forward part, dirty red on hind part, and  
 provided with a line of yellow dots very near hind margin; yellow spots  
 on sides of segments. Last three segments dull green with a broad deep  
 red band on hind part, also with yellow dots .....  
 ..... Panulirus laevicauda (Latreille) \*  
 (Cuba and Atlantic coast of South America from French Guiana to Brazil)
- 20(18). Color, indigo-blue with a fine transverse line near hind margins of each  
 of first three segments. Last three segments without a transverse line,  
 but with quite strong and regularly placed yellow spots (Fig. 7) .....  
 ..... Panulirus inflatus (Bouvier) \*  
 (Pacific coasts of Lower California and Panama, and Hawaiian Is.)
- Color, greenish with transverse yellow stripes on all segments ..... 21.
- 21(20). Transverse yellow stripes bounded by blue on either side .....  
 ..... Panulirus versicolor (Latreille) +  
 (East Africa to Japan and Polynesia)
- Transverse yellow stripes not bounded by blue .....  
 ..... Panulirus polyphagus (Herbst) \*  
 (Mauritius, coasts of India from Baluchistan to Singapore, Malay  
 Archipelago, Indo-China, Japan, and Polynesia)

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# VITAMIN A AND D POTENCIES OF THE LIVER OIL OF PACIFIC COD (GADUS MACROCEPHALUS)

By F.B. Sanford\* and H.W. Nilson\*

## ABSTRACT

Incidental to the observations on the king crab by the Alaska King Crab Investigation in 1941, a number of cod livers were taken for oil and vitamin analyses. As the season advanced from May to August, the oil content of the livers increased while the vitamin A potency of the liver oil decreased. During the early part of the season, the increase in oil content was faster than the increase in vitamin A content. During July and early August, the change in vitamin A potency of the oil was not great. The average for the entire catch was 1.29 million units of vitamin A per pound of liver.

Limited data on small samples of male and female cod livers taken from fish 30 to 33 inches in length on July 1947 are given.

The vitamin D potency of the composite liver oil was 200 U.S.P. units per gram of oil.

## INTRODUCTION

Incidental to the observations on king crab by the Alaska Crab Investigation<sup>1/</sup> in 1941, a number of samples of cod livers were taken for oil and vitamin A analyses. These livers were of particular interest, because, at that time, none was being processed. As a consequence, many tons were discarded at sea as a waste byproduct of the cod fishery. The results of the analyses indicated that Pacific cod livers are a marginal source of vitamin A which might be utilized at a profit under favorable market conditions.

## EXPERIMENTAL

### Mechanics of Sample Preparation

By 1947, the price of vitamin A was high enough to warrant saving the livers. A large quantity was brought to Seattle for processing, and the laboratory staff was fortunate in being able to core-sample a substantial proportion of them. The livers sampled were frozen in 5-gallon cans, and the cores were taken by means of an electrically-driven drill.<sup>2/</sup> Two cores were taken from each can. They were then combined and mechanically mixed until homogeneous. A quart of this material constituted the sample.

At the laboratory, the liver material was further comminuted by means of a Waring-type blender. The oil and vitamin A were then extracted by means of the

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1/"Report of the Alaska Crab Investigation," Fishery Market News, Vol. 4, No. 5a (May 1942-Supplement).

2/Sanford, F. B.; Bucher, G. C., "Drill Sampling Device for Fish Livers," Industrial and Engineering Chemistry, Analytical Edition, Vol. 18, No. 4, (April 1946), pp. 269-271.

Also Fishery Market News, Vol. 6, No. 11, (November 1944), pp. 6-11; and Fishery Leaflet 141.

shaking method.<sup>2/</sup> Ethyl ether was used as a solvent instead of the petroleum ether directed by the method.

### DISCUSSION AND RESULTS

Results of the analyses are given in Table 1. Since the samples were large, the results can be considered representative—at least for the year 1947. As the

Table 1 - Data for Cod Livers Taken During 1947

Identification of Samples	Fishing Area (Alaskan waters)	Fishing Period	Livers From Which Samples Were Taken	Oil Concentration in Livers	Vit. A Potency of Liver Oil	E Value Ratios of Liver Oil		Vit. A Potency of Liver Oil
						E 300 E 328	E 350 E 328	
		Dates	Number	% by Weight	Spec. units per gram			Millions of spec. units per pound
Z	Black Hill, Mel-sol Lagoon, Port Moller	5/25-6/2	10,426	28.1	14,000	0.655	0.648	1.79
Y	Port Moller	6/5-18	17,664	31.7	11,000	0.663	0.649	1.58
X	Cape Seniavin	6/18-7/4	17,949	33.7	8,260	0.702	0.640	1.26
W	Port Heiden	7/4-18	13,932	32.4	5,590	0.658	0.648	0.999
U X V	Port Heiden Cape Seniavin	7/18-8/9	22,241	41.2	5,380	0.663	0.639	1.01

1/2000 x E (1%, 1 cm., 328 mm., isopropanol).

season advanced from May to August, the oil content of the livers increased while the vitamin A potency of the liver oil decreased. During the early part of the season, the increase in oil content was faster than the increase in vitamin A content, so that the amount of vitamin A per unit weight of liver decreased. During July and early August, the change in the vitamin A potency of the oil was not great, and the amount of vitamin A per unit weight of liver remained almost constant. (Hence, if only a limited space is available on board ship for storing the livers, they should be taken during the early part of the season.) The weighted average for the entire catch was 1.29 million units of vitamin A per pound of liver. This compares closely with the average of 1.18 million units obtained for the year 1941.

Small samples of livers were available from fish 30 to 33 inches in length. The results of these analyses are presented in Table 2. Due to the limited nature of these data, no conclusions can be drawn.

Table 2 - Data on Small Samples of Male & Female Cod Livers Taken From Fish 30-33 Inches in Length on July 7, 1947

Sex of Fish	Weight of Sample	Oil Concentration in Livers	Vit. A Potency of Liver Oil	E Value Ratios of Liver Oil		Vit. A Potency of Livers
				E 300 E 328	E 350 E 328	
	Pounds	% by Weight	Spec. units per gram			Mil. of spec. units per lb.
Male	5.75	36.6	7,020	0.715	0.646	1.16
Female	6.25	33.3	8,640	0.692	0.634	1.31

The vitamin D potency was determined on a composite sample of liver oil. This assay was conducted in accordance with the method promulgated by the Association  
<sup>2/</sup>Anonymous, "Preliminary Procedures for the Analysis of Vitamin A in Fishery Byproducts," (Method A), *Commercial Fisheries Review*, Vol. 9, No. 1, (January 1947), pp. 40-41.



of Official Agricultural Chemists, but only 6 to 10 chicks were used in each group. The potency of the cod liver oil, according to this assay, was 200 U.S.P. units of vitamin D per gram.

It is interesting to compare the results obtained by us for the Pacific cod with those obtained by Pugsley, Morrell, and Kelly<sup>4</sup> for the Atlantic cod. It would appear that the livers of the Atlantic cod contain somewhat more oil, but that the vitamin A and possibly the vitamin D potencies cover roughly the same ranges.

<sup>4</sup>Pugsley, L. I.; Morrell, C. A.; and Kelly, J. T. "A Survey of the Vitamin A and D Potencies of the Liver Oil of Atlantic Cod (*Gadus morrhua* L.), Canadian Journal of Research, Vol. 23, (July 1942), pp. 243-52.

**ABSTRACT:** A survey has been made of the variations and of some of the factors influencing the variations of the vitamins A and D potencies of the liver oil of cod landed at ports in Nova Scotia, New Brunswick, and the Gaspé peninsula of Quebec. An increase in the vitamin A potency was paralleled by an increase in the vitamin D potency and the oil content of the liver increased with the percentage liver in the fish. An increase in the oil content of the liver and of the liver content of the fish was accompanied by a decrease in the concentration of vitamins A and D in the oil. The vitamin potency of the oil tended to decrease as the fishing season advanced from June to October and the oil content of the liver increased during this period. When the yield of vitamins was expressed per 100 gm. of fish there was no apparent seasonal change in potency indicating that the seasonal changes observed were due to dilution. A relationship was observed between the stages in the spawning cycle and the oil content of the liver. Fish classed as "steaks" (six to eight years) yielded a liver oil higher in vitamins A and D potencies than "market cod" (four to six years) and the liver oil of "scrod" (three to four years) had the lowest vitamins A and D potencies.



#### BAKED LAKE TROUT

3 or 4 pound dressed lake trout	3 slices bacon (optional)
4 tablespoons butter or other fat, melted	1½ teaspoons salt

Clean, wash, and dry fish. Rub inside and out with salt. Place fish in a greased baking pan. Brush with melted fat and lay slices of bacon over the top. Bake in a moderate oven 350° F. for 40 to 60 minutes or until fish flakes easily when tested with a fork. If fish seems dry while baking, baste occasionally with drippings or melted fat. Serve immediately on a hot platter, plain or with a sauce. Serves 6.

Other dressed fish may be used in the above recipe.



March 1949

Beaufort, N. C.

Tests on various twines attached to wooden frames and exposed to sea water showed, after four months' exposure, that the acetylated cotton twine and other types of net material were in good condition while the tarred samples had lost much of their tensile strength.

Boston, Mass.

After five months' storage, the fillets cut from fish frozen in the round at sea were still superior on the basis of organoleptic and chemical tests to fillets from fish dressed and iced at sea. All the samples showed the effects of prolonged storage through dessication and a gradual color loss. The samples varied considerably in the amount of drip.

\* \* \*

The storage tests on the rosefish fillets series were completed after the fifth month's examination. The fillets from rosefish frozen in the round at sea were considered superior when judged from the standpoint of quality, flavor, and drip, to fillets from fish iced at sea.

College Park, Md.

Studies to determine the precision of the vitamin A bio-assay so far indicate that one U.S.P. unit per day per rat is too little and three units per day is too much. This is in accordance with previous experience when standard cod liver oil was used instead of vitamin A acetate.

\* \* \*

After 5 months of storage, the tightly-wrapped mackerel fillets held at  $-10^{\circ}$  F. reached the limit of their storage life. Although no "rusting" was apparent, the fillets darkened considerably in some instances; also, a strong fishy odor developed, rather than a pronounced rancid odor. The fillets held at  $0^{\circ}$  F. were definitely unacceptable, having more of a rancid odor but also a strong fishy odor; no "rusting" was apparent. This, in general, was true also for the fillets undergoing one-day and three-day fluctuations in temperature between  $-10^{\circ}$  F. and  $0^{\circ}$  F.

On the basis of palatability scores, the scores for the fillets undergoing fluctuating temperatures between  $-10^{\circ}$  F. and  $0^{\circ}$  F. fall between those for fillets held at a constant temperature of  $-10^{\circ}$  F. and a constant temperature of  $0^{\circ}$  F. Likewise, the scores for those fillets undergoing temperature fluctuations between

0° F. and 15° F. fall between the scores for fillets held at constant temperatures of 0° F. and 15° F. Volatile acid numbers (for showing relative freshness) have followed, in general, this same trend.

It appears that fluctuating temperatures, in themselves, do not have an appreciable effect on the quality of frozen fillets. Instead, the average storage temperature encountered during the fluctuations would seem more likely to be the determining factor.

\* \* \*

A series of fillets placed in zero storage to determine the suitability of a plastic dip for retarding moisture-vapor loss have shown, after one month of storage, that the weight loss from the plastic-dipped was substantially the same as the ice-glazed fillets.

\* \* \*

A new series of wrapped fish have been placed in frozen storage. Pan-dressed striped bass were first wrapped in vegetable parchment, then dipped in water, followed by an overwrap of locker paper or cellophane before freezing. Another lot was frozen first without wrapping, then glazed and wrapped with locker paper or cellophane. Much time was saved in handling and wrapping by using the former method. Periodic tests on quality will be made over an extended storage period. This method of wrapping is being tried for use primarily in the locker plant or in home freezing, though it may have other applications.

### Ketchikan, Alaska

The Alaska Territorial Legislature appropriated the sum of \$50,000 to the Fisheries Experimental Commission for the biennium, 1949-1951. These funds will be used to continue the present work and for research on other important problems connected with the utilization of Alaskan fish. The work at the Ketchikan Fishery Products Laboratory is carried on jointly by the Alaska Fisheries Experimental Commission and the U. S. Fish and Wildlife Service.

\* \* \*

Results of preliminary tests at the Experimental Fur Station on the utilization of salmon cannery waste indicated that the feeding of canned processed waste to fur-bearing animals produces a better pelt than fresh frozen waste. These tests, however, must be continued for several more seasons before specific findings can be reported.

### Seattle, Wash.

The annual Open House was held for three consecutive nights, March 14-16. On the first evening, there was a special showing for the members of the Puget Sound Section of the Institute of Food Technologists. The other two nights were open to the general public. Altogether, nearly 400 visitors were registered.





# TRENDS AND DEVELOPMENTS

## Additions to the Fleet of U. S. Fishing Vessels

Fifty-one vessels of five net tons and over received their first documents as fishing craft during February 1949, 2 more than January 1949 and 4 more than in February 1948. Washington led with 7 vessels documented during February, followed by Texas and Virginia with 6 vessels each. During January and February 1949, a total of 108 vessels were documented compared with 92 during the same period in 1948.

Vessels Obtaining Their First Documents as Fishing Craft, February 1949

Section	February		Two mos. ending with Feb.		Total 1948
	1949 Number	1948 Number	1949 Number	1948 Number	
New England .....	-	1	2	3	52
Middle Atlantic .....	6	2	7	2	40
Chesapeake Bay .....	6	4	12	5	59
South Atlantic and Gulf .....	19	28	53	46	541
Pacific Coast .....	12	9	19	25	347
Great Lakes .....	3	1	8	2	51
Alaska .....	5	1	6	7	81
Hawaii .....	-	1	1	2	12
Total .....	51	47	108	92	1,183

Note: Vessels have been assigned to the various sections on the basis of their home port.



## ECA Procurement Authorizations for Fishery Products

During April 1949, the Economic Cooperation Administration announced, among the procurement authorizations for commodities and raw materials, a total of only \$647,000 for the purchase of fishery products. All of the month's authorizations were for purchases to be made in the United States and possessions.



In addition, ECA announced on April 12 the cancellation of an authorization for \$668,000 which was to be used for the purchase of canned fish from the United States and possessions for delivery to Greece. The cancellation was due to the failure by Greece to issue import permits for this procurement.

Of the total amount (\$21,076,911) authorized by ECA for the procurement of fishery products, only \$3,860,800 will be used for purchases in the United States and possessions.



Since the recovery of Western Europe's transportation system has been rapid, ECA announced on April 11 that it has aided in the movement of fishery products,

#### ECA Procurement Authorizations for Fishery Products, April 1949

Product	Country of Origin	Procuring Agency	Recipient Country	Amount Authorized
Fish, canned <sup>2/</sup>	U.S. & Possessions	Ireland	Ireland	\$ 450,000
Oil, fish	U.S. & Possessions	U.S. Dept. Army	Fr. Zone Germany	35,000
	" " "	U.S. Bur. Fed. Supply	Korea	162,000
Total for April 1949 .....				647,000

#### Total ECA Procurement Authorizations for Fishery Products, April 1, 1948-April 30, 1949

Fish, canned	U.S. & Possessions	Greece, Italy, Ireland, Belgium-Luxembourg	Greece, Italy, Ireland, Belgium-Luxembourg	2,010,800
Fish, salted	Newf. & Canada	Italy & Fr. West Indies	Italy & Fr. West Indies	5,179,000
Fish meal	Canada, Iceland, Norway, & Angola	Denmark, Austria, & U.S. Dept. Army	Denmark, Austria, & Bizonia	3,457,361
Oil, herring	Iceland	U.S. Dept. Army	Bizone Germany	1,694,000
" , seal	Newfoundland	France	France	257,600
" , shark liver	Latin America except Argentine & Brazil	France	France	250,000
" , fish	U.S. & Possessions	U.S. Dept. Army & Bur. Fed. Supply	Bizone & Fr. Zone Germany & Korea	487,000
" , technical fish	U.S.	U.S. Dept. Army	Bizone Germany	100,000
" , whale	Netherlands, Belgium, Norway, & U.S.	Austria, France, & U.S. Dept. Army	Austria, Bizone & Fr. Zone of Germany	7,074,150
Vit. A (Commercial grade, for stock feed)	U.S.	Netherlands	Netherlands	567,000
Grand Total Authorized .....				21,076,911

<sup>1/</sup>Where the recipient country is shown as the procuring agency, the government of the participating country or its authorized agents or importers do the purchasing.

<sup>2/</sup>Except salmon and tuna.

and "seafood no longer is rotting on the docks and piers for lack of sufficient transportation."



### Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, February 1949: Fresh and frozen fishery products purchased during February 1949 by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding amounted to 1,434,866 pounds valued at \$478,040 compared with 931,197 pounds valued at \$344,732 for January 1949, and 1,237,656 pounds valued at \$462,052 a year ago. Purchases for the first two months in 1949 totaled 2,366,063 pounds valued at \$822,772 as against 2,546,795 pounds valued at \$971,726 for the corresponding period the previous year.



### Fishery Biology Notes

AGREEMENT ON HARD CLAM INVESTIGATION: An agreement was entered into on April 7, by Rutgers University, which is the State University of New Jersey, and

the Fish and Wildlife Service, both interested in the conservation of the hard clam (*Venus mercenaria*), particularly of the New Jersey coast. This agreement will make possible a thorough study of the present status and possibilities for restoration of clam fishing in this State.

**NORTH CAROLINA SHRIMP AND FISHERIES RESEARCH AGREEMENT:** On April 11, 1949, the Fish and Wildlife Service and the Institute of Fisheries Research of the University of North Carolina entered into an agreement for investigations of shrimp in North Carolina waters; studies of the distribution and abundance of larval and post-larval shrimp in the sounds, inlets, and coastal North Carolina waters; and the formulation of plans for future research on shrimp.

Also, on April 21, 1949, the Service and the Institute of Fisheries Research entered into an additional agreement for a cooperative investigation of the oceanographic conditions and the kinds, abundance, and distribution of fish and invertebrates in the coastal waters of North Carolina.

**PROGRESS ON CLAM RESEARCH PROGRAM:** The Clam Investigation authorized by the 80th Congress has developed its plans for the research program on hard- and soft-shell clams. This summer, the headquarters for this Investigation will be moved



MAINE DIGGERS GATHER SEED CLAMS FOR A RE-SEEDING PROJECT.

from Woods Hole, Massachusetts, to the lobster hatchery near Boothbay Harbor, Maine. The Investigation has three biologists at Boothbay Harbor studying management problems of the soft-clam fishery. In addition, experimental soft-clam farming in some of the bays near Boothbay Harbor is planned.

Another three-man unit is located at Newburyport, Massachusetts, where the largest commercial clam fishery of Massachusetts was formerly located. This group is working primarily on commercial farming of soft clams.

Hard-shell or quahaug clam studies for the northern area are centered at Wickford, Rhode Island, where two biologists are setting up an experiment to determine the relative effects of tonging versus power dredging. In Rhode Island, studies of management methods will be conducted, and an experimental quahaug farm is planned. Although private clam farming is not legal at the present time in this State, it is hoped that methods can be developed which will apply in other areas.

Part of the appropriation has been allocated for the study of artificial propagation of hard- and soft-shell clams at the Service Laboratory in Milford, Connecticut. At the same time, the other units of the Investigation will attempt to develop methods of obtaining seed clams from natural reproduction.

Two graduate student fellowships at Rutgers University in New Jersey have been established to carry on work on certain phases of quahaug research. One of the men will concentrate on the development of cultching methods for obtaining seed quahaugs; the other man will make observations on the types of plankton which the quahaugs use as food in New Jersey waters.

During the next fiscal year a research unit somewhere along the southern coast will be established. The actual site of this investigation has not been chosen, but it may be that the unit will be located at the Service Laboratory at Beaufort, North Carolina.

Eventually quahaug farming may increase the clam production in southern states, but even at the present time the difficulty seems to be in the development of marketing and fishing methods more than in a scarcity of clams.

REESTABLISHING ATLANTIC SALMON IN THE ST. CROIX RIVER: At a meeting held at St. Andrews, New Brunswick, on April 12, the Chief of the Service's Section of Anadromous Fisheries, the Chief of the Service's Atlantic Salmon Investigations, and officials of the State of Maine, discussed with Canadian fishery administrators and biologists the problem of reestablishing runs of Atlantic salmon in the St. Croix River. They mutually agreed that a physical and biological survey of the river would be necessary before steps for remedial measures were taken. These measures would include, primarily, provision of fishways at three dams on the St. Croix River, and stocking of stretches of the river above these dams with young Atlantic salmon. Accomplishment of these measures would be dependent upon the findings of the survey, which would show whether or not it would be economically and biologically feasible to reestablish the runs.

The surveys will be carried out during the summer of 1949 and another meeting will be held in the fall for the purpose of reporting findings and discussing further measures.

SEA LAMPREY INVESTIGATIONS: The Chief of the Great Lakes Fishery Investigations at Ann Arbor, Michigan, reports the formulation of a detailed outline for the proposed operations of the sea lamprey-lake trout investigations during the fiscal year 1950.

Data from the monthly reports of commercial fishermen of the State of Michigan have been compiled and analyzed in order to obtain information on the incidence of sea lamprey scars on lake trout and other species in various localities and seasons, and the effects of scarring on marketability. A number of streams tributary to central and northern Lake Huron have been examined to select suitable locations for experiments to test the possible value of introducing the American eel (*Anguilla rostrata*) as a predator on the larval stages of the sea lamprey.

STRIPED BASS TAGGED IN NORTH CAROLINA: Over 200 striped bass have been tagged in the Santee-Cooper River system in South Carolina by the Service through cooperative arrangement with the Inland Fisheries Section of the South Carolina State Board of Fisheries, according to the Chief of the Middle Atlantic Fishery Investigations of the Service's Branch of Fishery Biology. This experiment will be an attempt to determine the migratory habits of these fish and to what extent they ascend through the ship canal to the upper reaches of the reservoir. After the dam built in the Santee-Cooper Rivers in 1937 created a large impoundment, there was a phenomenal run of striped bass in these waters. Since these fish spend considerable time at sea, tags probably will be returned from distant areas.

USE OF SONIC EQUIPMENT TO GUIDE FISH: Experiments begun recently at the U. S. Fishery Station, Kearneysville, West Virginia, on the use of sonic equipment to guide fish have been completed. The results of these experiments, as with similar ones performed in the fall of 1947, according to the Chief of the Section on Anadromous Fisheries of the Service's Branch of Fishery Biology, were negative. Apparently, fish do not react to vibrations produced with this type of equipment, regardless of their intensity or frequency.

U. S. FISHERY LABORATORY AT BOOTHBAY HARBOR: The Service's Branch of Fishery Biology is establishing a fishery laboratory at the hatchery located at Boothbay Harbor, Maine. It will be the headquarters of the soft-clam investigations. The Chief of the Clam Investigations and a staff of assistants will be stationed there.



### Gulf Fisheries Trends, April 1949

RED SNAPPER FISHERY: Shrimp vessels turn to snapper fishing during the off seasons in the Gulf, according to a mid-April report from the Service's Fishery Marketing Specialist making a statistical survey of the Gulf fisheries. However, the red snapper market has continued to weaken during the past few months.



RED SNAPPER

NEW PRODUCTS: A few new products are making their appearance on the market. A fan-tail shrimp is now being marketed in Georgia. It consists of a cleaned, deveined, headless shrimp with the fan part of the tail left on. The shrimp are dipped in batter,

frozen, and packed in 12-oz. containers ready for cooking. They are reported to retail for 85 to 90 cents a package.

Another firm on the Gulf is marketing canned shrimp cakes. The description of the product is about the same as for codfish cakes except that it contains shrimp instead of cod.

OYSTER FISHERY: During 1948-49, the Mississippi oyster industry had a poor season. Due to the possibility of the Mississippi spring flood waters flooding reefs and killing the oysters, the Mississippi Seafood Commission met on March 18 and decided to open the Mississippi reefs on April 1. Canned oysters in mid-April were reported steady at \$14.00 per case and showed signs of advancing.



### Indo-Pacific Fisheries Council Meets

The inaugural meeting of the FAO Indo-Pacific Fisheries Council held in Singapore from March 24-31, was concerned primarily with the business of getting the Council organized into workable form, according to the Food and Agriculture Organization.

A call for quick results in the war against starvation by wresting riches from the seas was made by FAO Director-General N. E. Dodd in opening the first



meeting. The rich resources of the seas, as yet virtually untapped, Mr. Dodd said, promise the quickest results in the battle against starvation and the disease and misery which follow in its train.

Eleven countries—Australia,<sup>1/</sup> Burma, Ceylon, China, France, India, the Netherlands, the Philippines, Siam, the United Kingdom, and United States of America—have accepted the agreement for establishment of the Council.

The Indo-Pacific Fisheries Council is the first of a series of such regional fisheries councils to be established. The Council's primary aim is to further the development, utilization, and conservation of the fisheries and thereby improve nutritional standards. In the Indo-Pacific area, there is a general shortage of animal protein in the diets of the people. To help make up for this deficiency, greater utilization of fish products is hoped for. The Council's immediate aim is the "development and proper utilization of the living aquatic resources of the Indo-Pacific areas" through the encouragement and coordination of research and the application of improved methods.

Among other functions of the Council are:

1. To disseminate technical information relating to living aquatic resources;
2. To recommend research and development projects;
3. To assist member countries to secure essential materials and equipment;
4. To report annually to the FAO Conference.

The following is a summary account of the proceedings of the Council as given in the preliminary report of this first meeting:

The meeting opened on Thursday, March 24, 1949, at 10:30 a.m. with addresses from the Honourable Malcolm MacDonald, Commissioner-General for the United Kingdom in South East Asia and from Mr. Morris E. Dodd, Director-General of the United Nations Food & Agriculture Organization.

The meeting was attended by 32 representatives of eight nations. Four of these representatives acted as Observers on behalf of the South Pacific Commission and five other representatives attended as Observers on behalf of Korea, UNESCO and SCAP (see list).

The meeting consisted of twelve scheduled and one special session and of various Committee Sessions. In addition, there were three evening Symposium Sessions.

The Council elected Dr. Bhai Prashad as its Chairman and Dr. J.D.F. Hardenberg as its Vice-Chairman. These elections were confirmed after adoption of the Council's Rules of Procedure and these gentlemen are, therefore, the Council's Officers for the current year.

The Council discussed and adopted Rules of Procedure for the conduct of its business at meetings and the performance of its functions between meetings.

The Council established two technical committees of the council, one for biology and hydrology and one for technology and economics. The technical committees were given specific terms of reference and program of work on which they are to report at the next meeting.

The Council decided to inform the International Commission for Zoological Nomenclature that it had no funds available to enable it to accept the Commission's proposal in connection with standardization of names of commercially important fish.

However, the Council directed Technical Committee I to communicate with the ICZN to discuss the ways in which such work might be initiated.

A report was received on the matters relating to fisheries discussed at the Seventh Pacific Science Congress.

Reports were received from the Technology and Taxonomy Committees appointed at Baguio and were referred to the Technical Committees.

The proposal for the establishment of a panel of experts was approved in principle and referred to the Technical Committees.

The survey of institutions, vessels, etc., was reported; the project was approved and Council requested its continuation and completion.

The Council adopted a budget for 1949 and submitted comments on commitments for 1950.

The Council agreed on a basic publication (the report of its meetings) and on occasional mimeographed publications.

The Council left it to the Executive Committee to decide on the place of the next regular meeting. Subsequent to the close of the meeting, an invitation to hold the 1950 meeting in Australia was received and probably will be accepted by the Governments who are members of the Council.

The Council devoted a large part of its time to the reading of technical papers of which 21 were contributed and 6 were contained in the work paper series. In addition, 4 papers were presented during the symposium sessions.

<sup>1/</sup>Notification was received by FAO on March 10, 1949.

## LIST OF DELEGATES AND OBSERVERS

Australia

Dr. H. Thompson (Delegate), Chief, Division of Fisheries, CSIR, Cronulla, N. S. W.

F. T. Hower, Esq. (Alternate), Acting Official Secretary, Australian Commissioner's Office, Singapore.

Ceylon

Dr. G. Amirthalingam, Director of Fisheries, Ceylon.

China

Dr. Wa Paak Shing, Consul-General of the Republic of China, Singapore.

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Mon. Lemasson (Delegate), Chief, Services des Pêches et Chasses de l'Indo-Chine, Phnompenh.

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Dr. Baidi Prashad (Delegate), Fisheries Development Adviser, Dept. of Agriculture, New Delhi.

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Dr. J. D. F. Hardenberg (Alternate), Head of the Laboratory for the Investigation of the Sea, Batavia.

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South Pacific Commission

Dr. Wa. E. S. Flory, U.S.A. | Mon. Lemasson, France.  
Dr. H. Thompson, Australia. | Dr. J. D. F. Hardenberg, Netherlands.

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Prof. J. W. H. Lugg, Prof. of Biochemistry.

Dr. J. W. Black, Supernumerary Tutor of Physiology.

Dr. N. K. Sen, Acting Professor of Bacteriology.

Dr. J. H. Strahan, Prof. of Social Medicine & Hygiene.

Dr. Lim Koh Ann, Tutor in Bacteriology.

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Dr. G. V. Allen, Principal Designate of the Univ. of Malaya.

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Prof. R. A. Robinson, Professor of Chemistry.

Dr. W. E. G. Dobby, Professor of Geography.

Prof. Lim Tay Deh, Ag. Professor of Economics.

Kiang Ai Kie, Esq., Lecturer in Chemistry.

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Ungku Aziz bin A. Hamid } Economics Department.

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Raffles Museum, Singapore

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Washington

Norris E. Dodd, Esq., Director-General.

Mr. Orr, Asst. Sec. General of the International Emergency Food Committee.

Mr. Veillet Levalles, Spec. Asst. to the Director-General.

Dr. J. L. Kask, Fisheries Division.

Bangkok

Charles L. Colman, Esq., Information Officer.

Singapore

Dr. G. L. Kesteven, Regional Representative (Fisheries).

The Chief of the Fisheries Division of the Natural Resources Section of SCAP, who served as observer, informed the Council of the status of Japanese fisheries and of the rehabilitation program now under way. It was also suggested that the Council might wish to have Japanese scientists present at future meetings to permit fuller exchange of ideas and technical information. This would also enable the Japanese to carry back to the home islands first-hand impressions of the attitudes of neighboring nations toward Japan, and only in this way would it be possible to impress fully upon the Japanese the need for international goodwill and cooperation in fishery matters.



## Massachusetts Fisheries Trends, April 1949

**FISHING FOR ROSEFISH AT NIGHT:** Recently, a U. S. Labor Department arbitrator rendered a decision that the practice of fishing for rosefish at night by Gloucester vessels was contrary to a clause in the existing contract between the Atlantic Fishermen's Union and the Gloucester Vessel Owners and, therefore, must be stopped, according to a mid-April report from the Service's Fishery Marketing Specialist at Gloucester, Mass.

**SALE OF BOSTON TRAWLERS TO U. S. ARMY:** Reports indicate that two Boston trawlers were purchased by the U. S. Army to fish out of German ports and help increase the food supply of Bizone Germany. These two are the first of a reported 15 vessels to be purchased by the Army.



## New York City Fillet Production, 1948

The 1948 fillet production of the 29 firms in New York City filleting fish amounted to 8,028,000 pounds, valued at \$3,047,630, according to the Service's Fishery Marketing Specialist stationed at New York City.

The species filleted in New York City in 1948 were flounder (3,178,500 pounds valued at \$1,405,050), haddock (2,335,000 pounds valued at \$801,750), cod (2,212,500 pounds valued at \$768,350), and hake (302,000 pounds valued at \$72,480). Nearly all of the fillets were cut with skins off.

The New York City filleting industry is made up of small firms with the number of employees ranging from two to seven.



## New Truck for Transportation of Lobsters

A lobster company in Maine has received a new type of semi-trailer truck to be used for the transportation of lobsters, according to a report from the Service's Fishery Marketing Specialist stationed in Maine. It has a 500-gallon tank to hold sea water and a stainless steel rack that holds wooden boxes arranged like drawers. Each box will hold 50 pounds of lobsters. The water from the tank is sprayed into each box in a fine spray. This water is collected and returned to the tank where it is again used.

The capacity of this semi-trailer is six tons of live lobsters. The company is planning to use it to haul to mid-western cities, and if it works out, they may try to ship to California.



## Pacific Halibut Fishery Regulations for 1949

The International Fisheries Commission, under authority of the treaty between the United States and Canada for the preservation of the Pacific halibut fishery, recently issued the 1949 Pacific halibut fishery regulations, which became effective April 28, 1949. The season opened at 12 midnight, April 30, 1949.

The 1949 regulations are substantially the same as those for 1948 except for Section 11 which extends the definition of bait nets.

11. It is prohibited to retain halibut taken with a net of any kind or to have in possession any halibut while using any net or nets other than bait nets for the capture of other species of fish, nor shall any license or permit held by any vessel under these regulations be valid during the use or possession or board of any net or nets other than bait nets, provided that the character and the use of said bait nets conform to the laws and regulations of the country where they may be utilized and that said bait nets are utilized for no other purpose than the capture of bait for said vessel.

For this season the quota is the same as in 1948—54,000,000 pounds. The catch limits by area are as follows:

2. (a) The catch of halibut to be taken during the halibut fishing season of the year 1949 from Area 2 shall be limited to approximately 25,500,000 pounds of salable halibut, and from Area 3 to approximately 26,000,000 pounds of salable halibut, and from Area 4 to approximately 500,000 pounds of salable halibut, the weights in each or any such limit to be computed as with heads off and entrails removed.

In its regulation of the halibut fishery, the Commission has depended principally upon the division of the coast into areas (Area 1A, Area 1B, Area 2, Area 3, and Area 4), the setting of an annual catch limit for the more important areas, and the closure of each such area when its annual catch limit is reached. Heretofore, only two areas had catch limits, but in 1947 Area 4 was assigned a limit due to possible expansion of the fishery to it. No catch limits have been placed upon the other areas, which are closed to fishing at the same time as the important areas.

Areas 2, 3, and 4 are closed to halibut fishing on dates announced by the Commission during the season. These dates are those by which the Commission estimates that the respective catch limits will be caught. Area 1A closes with Area 2 or Area 3, whichever is later. Area 1B closes with Area 2. Area 4 closes with Area 3 unless it was closed earlier by reason of the attainment of its own catch limit.

In the event that the catch limits are not already attained and the areas closed before December 1st, the season in all areas automatically closes on that date.





## Pacific Oceanic Fishery Investigations--Organization and Progress

**INTRODUCTION:** In 1947, the Congress authorized the Secretary of the Interior to conduct fishing explorations and necessary related oceanographical, biological, technological, statistical, and economic studies to insure maximum development and utilization of the high seas fishery resources of the Territories and island possessions of the United States in the tropical and subtropical Pacific Ocean and intervening areas.

Funds appropriated by the Congress to the Department of the Interior for the fiscal year ending June 30, 1949, included \$1,000,000 for the Fish and Wildlife Service to finance this program during its first year of operation.

**ORGANIZATION:** The activities authorized are being carried out by a unit within the Fish and Wildlife Service known as Pacific Oceanic Fishery Investigations. The organization for conducting these investigations consists of the Director's office and four sections.

The aims of the Section of Exploratory Fishing with respect to the area authorized for the program are to locate new fishery resources, devise and test methods of capture, and to establish production data for the analysis of the problem of economic utilization by the potential industry. The primary objects of the Section of Biology and Oceanography are to provide information useful in developing the fishery through study of the habits and behavior of the fish in relation to oceanographic conditions and to secure the necessary biological knowledge for future maintenance of the fishery. The function of the Section of Technology is to develop the most efficient methods of utilizing the fish after they are caught, including full use of fishery byproducts, and to solve problems in transporting, storage, and processing of the catch. The fourth section is Administration.

**PROGRESS TO MARCH 1, 1949:** Since last July, the program emphasis has been on (1) recruitment of qualified personnel; (2) learning all possible about the problem; (3) providing suitable exploratory and scientific vessels; and (4) arranging for the construction of a laboratory in Honolulu.

Much study and thought has been given to the conversion, construction, and equipping of vessels which will be best adapted to the explorations and scientific research with which this office is charged. Particularly, has study been given to information developed in the venture of the M/V Pioneer, that of the Pacific Exploration Company's M/V Oregon and Alaska, in fishing trials, in the experience of the Japanese, and in observation of local fisheries in Hawaii and Saipan. From these data, it appears quite likely that the present methods and equipment of the live-bait and purse-seine fishing may require considerable modification before they can be used successfully and economically in the Central and Southwest Pacific. It might well be necessary to test and devise techniques new to American fishermen.

Most of the authorized area under the program lies in the zone of the trade-winds where the generally prevailing rough seas are apt to interfere with both purse-seine and live-bait fishing methods. The crew of the Oregon, at times, found that the wind made it difficult to even cast the live bait where it was wanted. Even near the equator in the region of the doldrums, the long-time weather records show a much smaller percentage of light winds than off Central America. In addition, the tunas, as far as can be learned, travel in smaller schools, do not appear on the surface as frequently, nor can they be chummed up and held near the vessel as well as along the Central American Coast. The schools also seem to move faster and act "wilder". This is reported true of both skipjack and yellowfin, with

yellowfin the least easily caught by surface methods. Supplies of live bait are decidedly limited over much of the area, suggesting need for its most efficient utilization and for the development of baitless types of fishing.

The seasonal changes in weather conditions and in the distribution and behavior of the tunas must also be taken into account. It appears that the location of the fishing operations may have to be shifted seasonally over long distances to take advantage of both favorable weather and the occurrence of tuna if a pattern of productive fishing is to be developed. On the brighter side, reports of abundance of tuna and other large pelagic fishes are impressive and promise ample reward for overcoming the technical difficulties of catching them.

The analysis of Central and South Pacific fishing conditions, and a comprehensive review of Japanese tuna fisheries, have been proceeding simultaneously with the reconditioning and planning for conversion of the surplus vessels that are on hand. As a result, a great deal of attention has been given to providing flexibility and versatility in the vessels' layouts and equipment. The two YP type vessels are to be fitted for live-bait fishing and facilities for deep fishing by flag lines and by trolling gear.

A study of the technical and financial feasibility of selling and replacing the M/V California, formerly owned by the Reconstruction Finance Corporation, with a smaller and more versatile vessel was made and a smaller vessel has been designed.

One of the YPs will be fitted out for commercial scale live-bait fishing operations with facilities for carrying bait in the deck bait tanks and four below-deck wells. Deck arrangements will be adaptable also to flag line and trolling operations. There will be sufficient refrigeration capacity for about 40 tons of tuna. The quarters will be rearranged to provide for 18 persons, including technical personnel, and will ultimately permit the installation of a small laboratory.

The other YP will have a lesser live bait capacity and refrigerated hold space, will be designed primarily for biological and oceanographic research, and will mount three winches—one for bathythermograph casts, one for hydrographic tests, and one for towing plankton gear and small nets. It is planned to provide this vessel with a small auxiliary driving unit with an independent motor, shaft, and propeller for proceeding at low speed while hauling plankton gear.

A third vessel, designed for exploratory fishing, will complete the fleet. This vessel will be fitted out primarily for purse seining and secondarily for trolling, flag lining, and gill netting.

All three vessels will have ample capacity for fuel, water, and stores to operate at long distances from their base in Honolulu without frequent stops for refueling and reprovisioning at outlying island ports.

Pending construction of the laboratory, the limited staff in Honolulu is occupying temporary quarters loaned by the Navy near Pearl Harbor. Several co-operative projects with the Navy, the Territorial Government, and the University of Hawaii, have been arranged, are in process of negotiation, or are in view.

Pending the construction of a laboratory in Honolulu, use has been, and is being made of the facilities of the technological laboratory of the Fish and Wildlife Service at Seattle, Washington. For instance, a project there has dealt

with the experimental production of tuna liver meals by varying methods of dehydration with a view toward maximum retention of oil-soluble and water-soluble vitamins. These experiments are of potential value to the tuna industry, poultry and animal feed manufacturers, and poultry and animal producers. Another project under way at Seattle is the development of a bibliography on the technological aspects of the tunas.

The headquarters office of the Pacific Oceanic Fishery Investigations will continue in the U. S. Appraisers Building in San Francisco only so long as the major problems of planning and construction are on the Mainland. It is expected that by the mid-summer of 1949, emphasis can be changed from preparation for operation to actual operation, and the complete staff can be headquartered in Honolulu. Prior to that time, it is expected that another series of meetings will be scheduled along the West Coast and in Honolulu, for the purpose of seeking the group advice and counsel of those interested in this program.



### Peru Requests U.S. Fisheries Expert

The Foodstuffs Branch of the Institute of Inter-American Affairs, U. S. Department of State, reports that the Peruvian Government approached its representative in Lima, Peru, early in 1949, requesting that the United States send experts to Peru.

- (a) to reorganize the administration of fishery matters, and
- (b) to supervise and modernize commercial fishing operations in Peruvian waters, and processing of the catch.

The Institute, after consultation with the Fish and Wildlife Service, agreed to provide an expert to reorganize the administration of government fishery activities, but advised the Peruvian government to employ private consultants to reorganize the fishing industry, since it felt that this was not a function of any United States Government agency. Mr. R. O. Smith of the Service's Office of Foreign Activities, who recently concluded a one-year U. S. fishery mission to Venezuela, has been assigned to the project. Mr. Smith's salary and expenses will be defrayed by the Institute of Inter-American Affairs.



### Reduction of California Anchovies and Herring Limited to Canning Operations

California's limited supply of herring and anchovies is too valuable as food for larger game fish and for canning to be reduced into commercial oils and livestock food, the California Fish and Game Commission believes, according to its February 2 Outdoor California.

Although applications for reduction have been turned down for many years, the Commissioners at their last meeting went on record for the first time in outlawing use of whole fish for non-food use, except as a byproducts operation by canneries. No permits will be issued for direct reduction of anchovies and herring.

The recommendation was made by the Chief of the Bureau of Marine Fisheries, who reported the herring and anchovy supply "limited," but not yet in danger of the decline experienced by California's sardine population in recent years.

## Tagging Program for West Coast Soupfin Shark

Additional information on the movements, growth, and biology of the soupfin shark is expected from the cooperative tagging program inaugurated last month by a Santa Barbara fisherman and the California Division of Fish and Game, according to that agency's March 30 Outdoor California.

The captain of the commercial fishing boat, Linda, placed colored disks on the backs of 11 small sharks caught in Baja California waters. The two male and nine female fish averaged five feet in length.

Since comparatively little is known about the habits of the Mexican component of the soupfin shark family, other shark fishermen are being encouraged to cooperate in the tagging program.



## U.S. Pack of Canned Oysters, 1948

The United States pack of canned oysters in 1948 amounted to 357,080 standard cases (48 4-2/3 ounce cans), valued at \$4,777,531 to the packers. This was a decline of 53,407 cases compared with the previous year, but an increase in value of \$518,046. Over half the 1948 pack of oysters was canned in Louisiana (32 percent) and Mississippi (24 percent). The Atlantic Coast and Gulf States accounted for 77 percent of the pack and the States of Washington and Oregon the remaining 23 percent. Oysters were canned in 2 plants in North Carolina, 3 in South Carolina, 13 in Mississippi, 18 in Louisiana, 10 in Washington, and 1 each in Alabama and Oregon.

Table 1 - Pack of Canned Oysters by States, 1948  
(Quantity & Value to the Cannery)

State	Std. Cases	Value
North Carolina, South Carolina & Alabama .....	73,196	\$ 838,699
Mississippi .....	85,673	1,157,740
Louisiana .....	114,722	1,486,177
Washington & Oregon .....	83,489	1,294,915
Total .....	357,080	4,777,531

Note: "Standard cases" represent the various-sized cases converted to the equivalent of 48 No. 1 cans to the case, each can containing 4 2/3-oz. (net weight) of oyster meats.

Table 2 - Pack of Canned Oysters by Size of Can, 1948 (Quantity & Value to the Cannery)

Size	Actual Cases	Value
4 2/3-oz. net (48 cans)	209,912	\$2,822,890
5-oz. net (48 cans)	70,082	1,162,189
6 1/2-oz. net (48 cans)	35,927	511,102
8-oz. net (48 cans)	2,395	56,103
Other sizes (std. cases)	17,934	225,247
Total .....	336,250	\$4,777,531

Table 3 - Pack of Canned Oysters, 1940 to 1948

Year	Atlantic Coast & Gulf States	Pacific Coast States	Total
(Standard Cases)			
1948	273,591	83,489	357,080
1947	318,550	91,937	410,487
1946	261,622	129,213	390,835
1945	220,847	5,117	225,964
1944	273,556	-	273,556
1943	344,931	937	345,868
1942	445,782	77,480	523,262
1941	465,854	191,191	657,045
1940	533,486	157,099	690,585

Note: Standard cases represent the various-sized cases converted to the equivalent of 48 4 2/3-oz. cans (14 pounds net).



## U.S. Pack of Canned Shrimp, 1948

The United States pack of canned shrimp in 1948 amounted to 558,870 standard cases (48 5-ounce cans), valued at \$7,791,313 to the packers. This was an increase



of 86,537 cases compared with the previous year, and was the largest pack since 1944. However, it was less than 35 percent as great as the record 1933 production of 1,613,408 cases. Nearly 80 percent of the 1948 pack was canned in Louisiana, while Mississippi cannery accounted for 14 percent of the production. Shrimp were canned in 16 plants in Mississippi, 37 in Louisiana, 2 in Alabama, and 1 plant each in Georgia and California.

Table 1 - Pack of Canned Shrimp by States, 1948

State	Std. Cases	Value
Mississippi .....	76,917	\$1,095,964
Louisiana .....	444,543	6,104,539
Ca., Ala., & Calif. ....	37,410	590,810
Total .....	558,870	7,791,313

Note: "Standard cases" represent the various-sized cases converted to the equivalent of 48 cans of 5-oz. each.

Table 2 - Pack of Canned Shrimp by Size of Can, 1948

Size	Actual Cases	Value
5-oz. net (48 cans) .....	1,546,126	\$7,601,078
7-oz. net (48 cans) .....	9,103	190,235
Total .....	555,229	7,791,313

1/Includes a small pack of another size converted to "standard cases."

Table 3 - Pack of Canned Shrimp, 1940 to 1948 (Quantity and Value to the Cannery)

Year	Standard Cases	Value	Price per Std. Case
1948	558,870	\$7,791,313	\$13.94
1947	472,333	8,192,004	17.34
1946	522,130	8,428,735	16.14
1945	214,971	1,913,633	8.93
1944	561,549	4,854,799	8.64
1943	660,436	5,360,647	8.12
1942	963,352	7,347,330	7.63
1941	884,874	4,882,544	5.52
1940	1,115,249	4,318,325	3.87

Note: Standard cases represent the various-sized cases converted to the equivalent of 48 5-oz. cans for both wet and dry pack.

The cannery, during the war and through 1946, packed almost exclusively in 7-ounce cans; but in 1947, the trend was more towards 5-ounce cans. In 1948, the pack consisted mainly of 5-ounce cans.

The value of canned shrimp to the cannery has increased steadily since 1940 from an average wholesale price of \$3.87 a standard case and reached a peak in 1946 and 1947 of \$16.14 and \$17.34 a standard case, respectively. However, in 1948, the price dropped to \$13.94 a standard case which is \$3.40 a case less than in 1947.

1/Price received by the cannery.



## U.S. Seal Skins Sold at Auction

A U. S. Government-owned lot of 27,862 Alaska fur-seal skins was sold at the annual spring auction in St. Louis by the Fouke Fur Co., April 11, the Fish and Wildlife Service reported April 15.

Proceeds of the sale totaled \$1,659,165. Fur buyers paid an average of \$59.55 per skin. Average price at the last fall auction was \$59.38; at last year's spring auction, \$70.10.

Dyed matara brown skins sold for an average \$62.87 each, compared to \$63.24 at the last auction of Government Alaska fur-seal skins. Average price of safari brown skins was \$49.57, as compared with \$55.35 last fall. Black skins averaged \$62.19, an advance from \$49.28 obtained in the previous auction.



BARRELS USED TO PACK AND SHIP FUR SEAL SKINS, ST. PAUL ISLAND, ALASKA.

## Virginia Fisheries Trends, April 1949

**ALEWIFE FISHERY:** Most of the 14 alewife (river herring) canneries in Virginia are receiving more fish than last year, according to a mid-April report from the Service's Fishery Marketing Specialist stationed at Weems, Va.

The price paid by the canneries this season is \$10.00-\$12.00 per thousand fish compared with \$12.00-\$15.00 per thousand fish a year ago.

A decline in the canned and pickled alewives in favor of the salted product is expected in some instances. In view of the expected drop in demand and prices of these hitherto profitable lines, the temporarily neglected salted alewife will get more attention. In Virginia, salted (corned and tight packed) alewives were a popular low-priced food until changing conditions during the war forced them out of the market. However, the dealers seem to believe that this would be a good time to again produce salted alewives because reports indicate that lower prices for canned fish and roe will prevail this coming season.

**NEW GEAR FOR CATFISH:** A new type of gear for taking catfish has been developed by two Prince William County fishermen. Fished in deeper waters of the Potomac, where the desirable blue catfish is found, it is neither a fyke nor a pot, but combines features of both. According to the fishermen, it has been quite successful.

**SHAD FISHERY:** Prices paid for roe shad by Virginia dealers late in March reached 52 cents a pound. However, in April, it is expected that roe shad will level off to 18 cents per pound, the price which prevailed a year ago. As yet, there are no signs of a glut like the one of 1944.



## Washington-Oregon Fisheries Trends, April 1949

**OTTER-TRAWL FISHERY:** Several Astoria, Oregon, packers and canners, who suspended bottom fish processing operations early this spring, announced that they would not start operating until the weak market for bottom fish improves. A price reduction on bottom fish is contemplated as the packers claim that it is impossible to continue operations at the present prices for fish, according to a mid-April report from the Service's Fishery Marketing Specialist stationed at Seattle.

Towards mid-April, about 40 Oregon boats tied up waiting for a decision as to the prices that are to be paid for bottom fish.

Seattle trawl landings continued high for the first part of 1949, and the local industry continues to pay the scheduled prices. However, the Seattle industry feels that it will be unable to continue as at present and contemplates a curtailment in operations.

**SALMON FISHERY:** Unprecedented prices were paid for king salmon in Ketchikan during March. Prices went as high as 45 cents a pound straight compared to 35 cents for large, 25 cents for small, and 25 cents for whites a year ago. Many of the trollers, which ordinarily wait until mid-April or May before making their first trips of the season went fishing early due to the high prices. Buyers explained that the record high prices were due to good demand for fresh salmon during the Lenten season and to convenient steamer schedules.

**SMELT FISHERY:** The smelt run in the Columbia River proper was believed to have been delayed by the cold weather which continued into February. When the fish finally appeared, they remained in the Columbia River much longer than usual, giving the gill-net fishermen operating from Clatskanie, Oregon, a very good season. Late in March, when the smelt continued their migration upstream, the entire run entered Lewis River, Washington. Normally most of the run enters Cowlitz River, Washington, with some going up Sandy River, Oregon. This year's catch in the Lewis River has been estimated at 1,500,000 pounds, somewhat less than last year's catch in all the Washington tributaries.

Although the opening price for smelt was 10 cents a pound, it dropped to as low as 4 cents a pound when the smelt entered the tributary streams and the market became glutted.



### Wholesale and Retail Prices

On March 15, 1949, the wholesale commodity index stood at 158.5 percent of the 1926 average, the same level as four weeks previous and 2.0 percent less than the comparable period in 1948, according to the Bureau of Labor Statistics of the Department of Labor. All foods registered an increase of 1.3 percent over February 15, but were still 7.3 percent below March 16, 1948.

The average wholesale prices of canned salmon increased slightly during March 1949 with pink 1.1 percent higher and red 0.2 percent higher than February 1949, and 14.3 and 3.1 percent higher respectively, than March 1948.

Wholesale and Retail Prices

Item	Unit	Mar. 15, 1949	Feb. 15, 1949	Mar. 16, 1948
<b>Wholesale: (1926 = 100)</b>				
All commodities	Index No.	158.5	0	- 2.0
Foods	do	161.0	+ 1.3	- 7.3
<b>Fish:</b>				
Canned salmon, Seattle:		Mar. 1949	Feb. 1949	Mar. 1948
Pink, No. 1, Tall	\$ per doz. cans	5.910	+ 1.1	+14.3
Red, No. 1, Tall	do	6.600	+ 0.2	+ 3.1
Cod, cured, large shore, Gloucester, Mass.	\$ per 100 lbs.	15.500	0	+ 3.4
<b>Retail: (1935-39 = 100)</b>				
All foods	Index No.	201.6	+ 1.0	- 0.3
<b>Fish:</b>				
Fresh, frozen and canned	do	325.9	- 0.4	+ 3.9
Fresh and frozen	do	266.8	- 0.1	- 2.0
Canned pink salmon	\$ per lb. can	60.7	- 0.1	+17.4

Retail food prices advanced 1.0 percent from mid-February to mid-March after a steady decline since July 15, 1948. However, due to the fact that the heavy production season for the fisheries was ushered in during March, retail prices of fresh, frozen and canned fish declined 0.4 percent compared with mid-February 1949, but were still 3.9 percent higher than mid-March 1948. There was only a slight decline in the index for fresh and frozen fish compared with the previous month, and a decline of 2.0 percent compared with March 1948.



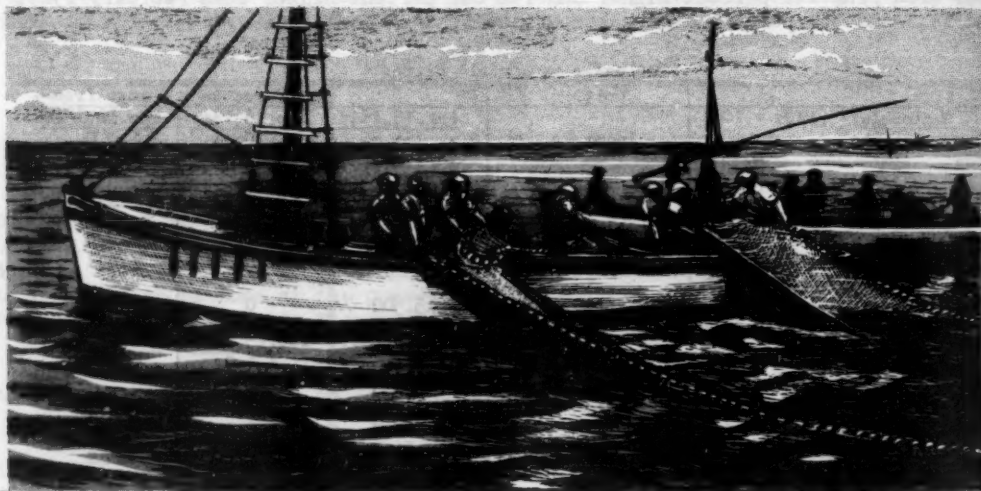


### Argentine Republic

**ANCHOVY FISHERY:** The anchovy is one of the most important species produced by the Argentine fishing industry, and is principally exploited in Mar del Plata, south of La Plata estuary. Fishing for anchovies begins the middle of September and continues until the first part of November.

During October 1948, 9,277,840 pounds of anchovies were taken, an amount greater than the total 1947 production of 9,129,648 pounds. Up to the end of October 1948, the total production was 10,090,520 pounds to which will be added the catch in November, when the season ends.

The anchovy fishery is prosecuted with boats of 6 to 10 metric tons working in pairs. Each boat, under favorable conditions, may produce as much as 35,200 pounds or as little as 4,400 pounds per trip. On the average, a pair of boats take about 13,200 pounds.



FISHING FOR ANCHOVIES. NET IS TAKEN IN BY TWO BOATS.

Mar del Plata, the center of the industry, has 82 plants for salting and canning anchovies registered with the Argentine Ministry of Agriculture. These plants have modern equipment and machinery and skilled technicians. Anchovies are processed in three forms: in small bottles; salted, similar to sardines; and in the form of various prepared anchovy products similar to those produced in other countries.



## Australia

**ESTABLISHING AN OYSTER CANNING INDUSTRY:** Japanese oysters are to provide the basis for an Australian oyster canning industry, according to a January 19 press release from the Australian Council for Scientific and Industrial Research. The Council has now successfully transferred a second batch of seed oysters from Japan to Pittwater in Tasmania as a foundation for the establishment of an oyster canning industry.

The imported oyster will not rival the local varieties. The Australian oyster has a demand as a fresh oyster which cannot be satisfied by the present industry. The Japanese oyster produces a large rather coarse meat which is usually used for processing.

First shipment of seed oysters from Japan was made in 1947, and the oysters were planted out in Oyster Bay in Western Australia and at Pittwater in Tasmania. The latest consignment was brought by the Council's Division of Fisheries from Hiroshima by sea. As the growth and survival rate of the oysters placed in Oyster Bay in 1947 was poor, the new arrivals were all distributed at Pittwater where growth and survival had been good.

There is now a stock of approximately 400,000 seed oysters at Pittwater. In the summer of 1949-50, the 1947 shipment should be ready to spawn; and those of the 1948 shipment in the following year. If spawning and spat fall are successful, the present stock should make an adequate foundation for the oyster canning fishery.

## Belgium

**FISHERIES REVIEW, 1948:** Consumption: There is no rationing of food in Belgium, and at present the consumption of fishery products is considerably above prewar, according to a February 28 report from the American Embassy at Brussels.

Total disappearance of fish in Belgium based on production, imports, and exports averaged about 90,000 metric tons per year before the war. In 1947, this figure was 135,158 tons, but some of this disappearance was represented by building up of stocks of canned fish in anticipation of the fact that duties were to be charged on canned fish beginning January 1, 1948. The 1948 disappearance of 117,870 metric tons represented a per capita consumption of about 31.9 pounds per year compared with about 24.2 pounds before the war.

Table 1 - Belgian Fish & Shellfish Catch, 1938, 1947-48

Type of Fish & Shellfish	1948 lbs.	1947 lbs.	1938 lbs.
Iceland cod .....	6,757,912	10,316,398	4,091,890
Other cod .....	9,657,987	10,346,809	5,053,245
Iceland haddock ....	2,887,639	4,195,211	973,247
Other haddock .....	3,692,649	2,845,368	1,908,918
Plaice .....	10,065,433	13,787,970	6,743,112
Ray .....	8,088,192	10,193,663	7,563,070
Turbot .....	1,650,526	1,888,174	1,631,436
Sole .....	3,913,925	5,887,512	4,999,489
Whiting .....	8,809,273	8,502,404	6,348,869
Full herring .....	31,902,092	33,533,423	12,943,440
Spent herring .....	17,337,045	37,819,841	
Sprat .....	5,098,146	1,333,917	2,551,177
Shrimp .....	3,632,906	4,484,689	6,489,813
Miscellaneous .....	28,273,795	20,894,533	24,199,461
Grand total .....	141,767,520	166,029,912	89,097,168
Total Iceland fish .	17,810,419	21,528,835	10,337,145

Production: Total production in 1948 amounted to 141,767,520 pounds (valued at \$10,627,150)—somewhat less than in 1947, but over 50 percent above prewar.

Table 2 - Belgian Imports & Exports of Fishery Products, 1948

Product	Imports		Exports	
	Metric Tons	Value	Metric Tons	Value
Fresh fish:				
Fresh-water	959	\$ 719,969	-	-
Herring	3,086	441,692	1,259	\$ 140,714
Other sea fish	9,069	2,899,492	5,131	1,511,882
Salted and				
smoked fish:			1,425	297,091
Herring	10,302	2,232,748	-	-
Other	917	539,327	-	-
Oysters,				
mussels, etc.:			1	3,013
Mussels	19,463	678,201	-	-
Other	2,246	2,021,171	-	-
Canned fish:			423	266,616
Sardines	9,092	5,983,749	-	-
Pilchards	853	459,471	-	-
Salmon	4,046	2,647,737	-	-
Other	1,638	1,456,958	-	-
Total	61,669	20,074,515	8,239	2,219,316

The Belgium Government does not grant any subsidies nor any other aid to the fishing industry.

Imports: As compared with 69,096 metric tons of fishery products imported in 1938, Belgian imports during 1947 totalled 81,139 tons, while during 1948 they amounted to 61,669 tons. Of the 4,046 tons of canned salmon imports, 3,113 tons came from Canada.

Exports: In 1938, Belgium exported 11,116

metric tons of fish; in 1947, 21,351 tons; and in 1948, 8,239 tons.

On January 21, 1949, a supplementary commercial agreement with Bizone Germany was reached under which Belgium may export to Germany up to June 30, 1949, \$735,000 of fresh sea fish, fresh and salted herring, and other salted fish.

Note: Values based on exchange rate of 1 Belgian franc equals 2.3 cents U. S.



## Bizone Germany

CRISIS IN GERMAN SEA FISHERIES: In Bremerhaven fish-catching circles, March 30, 1949, will be remembered as the "Schwarzer Tag" (black day), according to an April 5 American consular report from Bremerhaven. On that date the controlled distribution system for fresh fish broke down due to decreased consumer demand. Some 660,000 pounds of cod, haddock, and pollock (coalfish) could not be distributed at the controlled price and were put up for auction. In free bidding for cod, the offered price dropped to 3.3 cents per pound ex-auction hall, equivalent to 6.8 cents per pound to the consumer. Hoping to minimize their losses, the fish-catching firms stopped the auction at this point, and set a standard price of 5 cents per pound for all types and grades of fish. At this price 550,000 pounds were purchased by the local industry for processing by local plants, but the remainder had to be held and sold the next day. The significance of the day's events lies in the facts that the March 30th landings totaled only 1,540,000 pounds and that German fish consumption is higher preceding Easter than at any other time of the year.

Local fishing-ship owners are critical of several measures adopted by the Frankfurt authorities. The recently ordered 2.2 cents per pound increase in the price of fish is universally criticized. Ship owners are well aware that the demand for their product has become exceedingly elastic of late due to the hardening of the currency and to the increasing supplies of meat and fish. They realize

that any increase in the price of fish will seriously affect consumption. They almost without exception want to see the rationing of fish ended because they think that the distribution system now is over-inflated, and the difference between the cost to the consumer and the return to the fisherman is too great.

Another Frankfort action, privately criticized by fish-catching circles, is that of concluding 1949 fish imports contracts for 322,000 metric tons. On the average, the imported fish cost 10 percent more than domestic fish even after the recent 2.2 cents per pound increase, which is looked upon by some merely as an attempt by the Frankfort authorities to do away with the need for import subsidies. It is maintained that if the money paid out as a subsidy on imported fish had instead been used to rehabilitate the German fishing fleet, Germany would be better equipped for catching with its own ships the fish needed by its people, and in addition would have saved foreign exchange. The German fishing industry presently is not being subsidized, as it was before the currency reform, by being sold coal at less than cost.

The break in fish prices is not expected to hinder the construction of new fishing vessels of the 400-ton series, nor the chartering of used fishing craft from the United States. While neither the 400-ton craft nor the United States vessels will be as profitable as new, German-built, 600-ton vessels, they will be good enough when compared to the average vessel now in use. The local fishing companies are confident that imports will not be subsidized by the German taxpayer, and that the home fleet will thus be given an opportunity to compete with other fleets on a more equal basis.

Note: Values converted on basis of official rate of exchange of 1 Deutsche mark equals U. S. \$0.30

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RESEARCH ON FAT CONVERSION FROM PLANKTON: Dr. Richard Harder's pioneer experimentations in the production of fat from oceanic plankton are beginning to assume great importance as a possible source of future nourishment for mankind, according to an April 4 report from the American Consulate at Bremen. Dr. Harder is the dean of the mathematical-scientific faculty at the University of Goettangen. His experiments on the subject, begun during the war and encouraged by the effectiveness of the allied blockade of Europe, have awakened considerable interest in other countries. It may be particularly noticed in this respect that the British Government's Ministry of Food has established an experimental plant for such work at the Microbiological Research Institute at Trinidad.

Plankton, a microscopic type of oceanic plant life, is one of the abundant substances in the sea; it forms the main diet of whales and many fish. Dr. Harder, who is still principally occupied with this problem, is attempting to produce fat directly from the plankton; this would, of course, eliminate the fish or animal as the "middleman" in the production of the fat. He asserts that he has been successful in the basic experimentation. Attempts, however, to utilize his researches for the manufacturing of synthetic margarine and fat, have not yet worked out; Harder is therefore continuing his tests in an attempt to render his processes industrially practicable. No data has been published to date on these researches.



## Bulgaria

FISHERIES, 1947: The government has planned to increase the importance of fishing in Bulgaria, according to an April 7 report from the American Legation at Sofia. According to the Bulgarian press, 550,000 pounds of fish were caught during the spring of 1947, using the first organized deep-sea motor fishing fleet in Bulgarian history. The 1947 output of dolphin oil was 149,600 pounds compared with 116,600 pounds in 1946.

Legislation was passed in 1947, according to the Official Gazette, No. 264, of November 13, 1947, creating the "State Fish Hatcheries and Fisheries" for the purpose of organizing and developing deep-sea and inland fishing.



## Canada

BRITISH COLUMBIA HERRING FISHERY, 1948-49: The British Columbia herring are caught in the immediate vicinity of the shore, the fishery being known as "shore fishery." On the Pacific Coast, the main season, when huge catches are taken, runs through the fall and winter months. In the waters off British Columbia, purse seining is employed in the production of the major portion of the catch, though there is some gill-net fishing.

The 1948-49 British Columbia herring season closed on March 5, 1949, when it was discovered that the herring in the vicinity of Laredo Channel, the main fishing center, had begun to spawn. During that season, fishermen landed 189,251 tons, as compared with the catch of 171,434 tons the previous season, and received \$8.50 a short ton for herring destined to reduction plants and canneries, according to a March 18 report from the American Consulate General at Vancouver.

Although part of the herring catch is marketed fresh, the fish lend themselves to several forms of preparation. When Great Britain was badly in need of a cheap food, high in protein value, during the war years, more than a million cases were canned annually for that market in British Columbia. However, shipments to the United Kingdom practically ceased by 1948. As a consequence, the fishing industry here reduced its production of canned herring during the 1948-49 season to a mere 92,815 cases (48 pounds per case).

Production of meal this season amounted to 31,605 tons, most of which was sold in United States and the domestic market; prices f.o.b. Vancouver being quoted at \$1.75 per unit of protein early in the season, but \$2.75 per unit early in 1949.

The production of herring oil from this season's catch amounted to 3,081,528 gallons. Approximately 75 percent of the entire production of herring oil in British Columbia was sold either in the United States or in the domestic market. The price during most of the season was 15 cents a pound, but an early 1949 shipment to Denmark was made at a price of 11.85 cents per pound. The oil is used for feeding and also utilized for industrial purposes. There are now no Canadian export restrictions on herring meal or oil.



MARKETING 1949 BRITISH COLUMBIA SALMON PACK: Immediate prospects for the successful marketing of the 1949 British Columbia salmon pack are uncertain and anything but bright due to the loss of British markets, which in prewar years took 80 percent of the pack, according to a March 30, report from the American Consulate General at Vancouver. This year such markets are not expected to absorb more than 50,000 cases from an anticipated pack of 1,500,000 cases. In view of this, a Canadian fishermen and allied workers union on behalf of its members is urging the Canadian Government "to permit trade with our essential markets on a barter basis, by long-term credits and deferred credits, so that our industry may continue to produce to the limits of its capacity." The union also referred to the high United States duty on canned salmon, and to proposals made to Washington by American fishing interests to further restrict imports of fresh and frozen species of fish which are competitive with Canadian products.



PART OF THE BRITISH COLUMBIA SALMON TROLLING FLEET.

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MINIMUM PRICES GUARANTEED SASKATCHEWAN FISHERMEN: The Saskatchewan Fish Board has ceased operations as a commercial agency to buy and sell fish, the Saskatchewan Resources Minister announced in the legislature, according to an April 1 release by the Saskatchewan Bureau of Publications. However, the Board will continue to operate under the Department of Natural Resources and will guarantee a floor price to fishermen when it is economically and socially advisable to do so.

Floor prices will be established if fishermen request that the Department market their fish. Agent for this marketing operation will be the Fish Board Division of the Lake and Forest Products Corporation.

The suggested floor prices would pay fishermen the normal expenses of operation and provide a living while they are fishing. All returns from government-marketed fish would go toward paying the floor price and the expenses of marketing. Any surplus will be distributed to fishermen as a dividend. Any deficit will be paid by the Department and reported to the legislature by way of supplementary estimates.

Where floor price regulations are in effect, only local fishermen will receive licenses to fish, and limits will be set in accordance with good conservation practice and the needs of the fishermen.

The Department would increase its advisory and regulatory functions in the Province's fisheries for the purposes of improved conservation, improved quality of the product, and to assist fishermen to organize so that they will be better able to protect their marketing interests.



## Costa Rica

**FISHERIES REVIEW, 1948:** Exports: Costa Rican exports of fresh (frozen) tuna were almost doubled in 1948, but this increase was more than offset by the decline in exports of the canned product so that total tuna exports dropped below the 1947 total, according to a March 4 report from the American Embassy at San Jose.

Quantity		Value	
1948	1947	1948	1947
(metric tons)		(in thous. of U.S.\$)	
2,965	3,210	818	921

Fishing Gear and Bait: During 1947, a dispute flared up between bait and seine fishermen regarding the use of purse seines for tuna fishing, and it was proposed that purse seines be banned in Costa Rican territorial waters. The proposal never became law. In 1948, the dispute resolved itself through the depletion of bait (sardinas) in the Gulf of Nicoya, which for years was well stocked with bait fish. The Government seems to have decided that both types of gear are acceptable.

The bait situation in the Gulf of Nicoya became so acute that, in November 1948, a decree was issued by the Costa Rican Government closing that body of water to bait fishing for a period of six months. It is not yet known whether such a brief closing of the season will result in an increase in the depleted bait supply.

Tuna Catch Reported at Puntarenas: Although there was a scarcity of bait, political unrest in Costa Rica, and concern over pending decrees to regulate the activities of fisheries, a larger catch was reported through the customs office in Puntarenas than at any time within the past 10 years. Much of the tuna caught by boats based at Puntarenas came from as far away as the Galapagos Islands. A considerable amount also was caught off the Costa Rican and Panamanian coasts.

Tuna Cannery: The country's only modern canning plant, an American-owned tuna processing and canning plant located at Puntarenas, is operated only on a part-time basis. The manager of the plant stated that the extent of the future activities of the plant will depend principally upon the nature of the pending regulation and taxation measures.

Table 2 - Fresh, Frozen & Canned Tuna Catch Reported at Customs Office in Puntarenas, 1939-48

Year	Fresh & Frozen Tuna		Canned Tuna	
	lbs.	Value	lbs.	Value
1948	6,323,874	\$789,046	199,540	\$109,014
1947	3,858,534	404,239	3,205,473	516,962
1946	2,818,200	202,000	706,200	311,000
1945	1,432,618	112,759	498,333	185,167
1944	1,900,787	413,182	22,999	9,587
1943	991,481	73,078	45,485	20,092
1942	2,345,847	117,703	17,186	4,058
1941	1,843,184	147,920	-	-
1940	4,203,280	244,432	-	-
1939	7,465,260	413,441	-	-

Decree-Laws: As evidence of its belief that the State has at least an interest in all of the means of production within the country, the Junta has issued three decree-laws affecting the fisheries in Costa Rican waters. The first decree extended Costa Rican sovereignty over waters within 200 miles of the coast; the second laid the basis for the establishment of various conservation and control measures within these waters; and the third, issued in January of 1949, established various taxes to be paid by the fishermen.

Concern has been expressed by some United States fishing organizations as to the effect on them of such regulations when issued, in view of Costa Rica's claim to sovereignty for 200 miles at sea. Since tuna is the most important fish caught off Costa Rican shores, restrictive regulations would affect the tuna fishing industry more than any other.

Other Fishery Products: The only other fishery products in Costa Rica are shark livers and turtles. Of the former, all of which were exported to the United States, only 60 metric tons were exported in 1948 compared with 219 tons the previous year, and 146 tons in 1946. The value increased materially. In 1948, shark liver exports were valued at \$123,753, compared to \$53,061 and \$79,000 for 1947 and 1946, respectively.

Exportation of live giant turtles is still carried on from Port Limon on a small scale. Exports for 1948, all of which went to Panama, Colombia, and the Canal Zone, were 182,820 pounds valued at \$4,126.



## Denmark

GREENLAND FISHERIES, June-October 1948: The fishery, which was begun in Greenland waters in 1948 by several Danish companies with six cutters, a factory ship, and two other vessels, undoubtedly will continue, according to the January 1949 issue of the Danish publication Konserves. The fishery, in 1948 began in June and ended about October 1, and produced 683.6 metric tons of fishery products.

Salting occurred on shore and on the vessels. Freezing took place on the factory ship Greenland (290 gross tons), equipped with pressure plate freezers. It also was fitted out to fillet and salt fish, and produce liver oil. Filleted fish were frozen in about two hours between plates which could be brought down to about -22° F. It is not yet certain whether additional ships like the Greenland will be built or future freezing operations will be carried out on land.

Danish Production of Fishery Products in Greenland Waters (June-Oct. 1948)	
Product	Quantity
	Metric Tons
Halibut, frozen .....	2.8
Cod fillets, " .....	46.0
Cod, salted .....	577.0
Halibut, " .....	3.0
Pollock, ling, & haddock	21.0
Boe, cod .....	0.3
Liver, Greenland shark .	26.0
Oil, cod liver .....	7.5
Total .....	683.6



## Germany

PERMITTED TO CONSTRUCT LARGER FISHING VESSELS: An agreement between the Military Governors of the United States, the United Kingdom, and France in Germany, regarding limitations to be placed upon certain industries in Germany in the interest of security, was announced by the U. S. Departments of State and Army on April 13, 1949.

Article VIII (d) of the "Agreement Concerning Prohibited and Limited Industries in the United States, French and United Kingdom Occupied Areas of Germany" provides that capacity of Germany's shipbuilding industry shall be limited to that remaining after the removal of three yards, in addition to those four that have already been made available, for reparations.

Article XI (1) provides that the construction of ships whose size or speed does not exceed those listed in the Agreement shall be permitted in Germany, provided that no ocean-going ships shall be constructed until a German coastal fleet

adequate for the requirements for European and German recovery has been reconstituted. Included under this phase of the Agreement is the provision that Germany will be permitted to construct small craft (including fishing vessels and ships other than cargo-carrying craft) not to exceed 650 gross-registered tons and a speed of 12 knots. The former limitation for fishing vessels was 400 GRT, although Germany was permitted to use 51 fishing vessels in excess of this tonnage in accordance with allocations made by the Tripartite Naval Commission.

Notwithstanding anything contained in the Agreement to the contrary, the Military Governors, acting upon the advice of the Military Security Board, may authorize under license the construction of vessels having a greater speed than 12 knots that are shown to be essential for such purposes as the prevention of smuggling and illegal fishing, frontier control, etc.



### Iceland

DISPUTE BETWEEN SEAMEN'S UNIONS AND TRAWLER OWNERS SETTLED: The fishing trawlers of Iceland, which stopped fishing on February 10, resumed operations on March 26, according to the April 2 issue of the British periodical, Fish Trades Gazette. The dispute centered around the refusal of the trawler owners to continue paying a full war-time bonus to Icelandic fishing crews which land their fish in Great Britain and other foreign countries. (See Commercial Fisheries Review, April 1949, page 49).

The exact terms of the agreement are not known in full. It is understood that some bonus, but less than that paid during the war years, will be paid to those boats landing their catch outside of Iceland.

\* \* \* \* \*

FAROESE FISHING RIGHTS IN ICELANDIC WATERS: A law extending the period of time in which Faroese have the right to engage in hand-line fishing from deck vessels, with or without engines, and from open boats within Icelandic territorial waters was passed by the Icelandic Althing on December 17, 1948. The period is extended to the close of the year 1949. This law amends the Act of October 9, 1946, which was passed pending the completion of the negotiations now in progress as a result of the abrogation of the Danish-Icelandic Union Pact of November 30, 1918, according to a February 11 American consular report from Reykjavik.



### Italy

TO DEVELOP COD FISHERY IN ATLANTIC: The Superior Council of the Merchant Marine has approved a report on the importance of the ocean fisheries to Italy and has expressed the opinion that it will be to Italy's interest to develop the Atlantic Ocean fisheries and particularly that of the cod fishery, according to the November-December 1948 Bollettino di Pesca of the Department of Agriculture and Forest. The Department of the Merchant Marine, Treasury, and Foreign Commerce, are studying ways and means of obtaining adequate financial aid for Italian cod fishery enterprises.



**FINANCIAL ASSISTANCE FOR NEW FISHING VESSEL CONSTRUCTION:** The Italian Government will provide financial assistance for the building of fishing vessels. The new plan, approved by the Council of Ministers, provides for financial assistance for building fishing vessels of under 500 gross registered tons. For all fishing vessels, regardless of size, certain funds are allotted for financing the installation of electric and refrigerating plants. The purpose of this aid is to encourage the installation of refrigerating equipment on fishing vessels. Various other financial provisions are included in this plan for the Government to aid the fishing industry to build fishing vessels.



### Japan

**LANDINGS OF FISHERY PRODUCTS, 1948:** The estimated total Japanese production of marine fishery products during 1948 (excluding aquiculture and Antarctic whaling)

Japanese Official Reported Landings of Marine Products by Species, 1948

Species	Quantity	Species	Quantity
Fish:	Metric tons	Fish (Continued):	Metric tons
Herring .....	92,227	Sharks .....	90,397
Atka mackerel .....	52,395	Others .....	456,070
Sardine .....	316,277	Total .....	1,521,759
Bonito .....	45,589	Other Marine Products:	
Tuna .....	31,079	Shellfish .....	71,662
Mackerel .....	80,064	Crustacea .....	28,705
Horse mackerel .....	21,329	Cuttlefish and octopus .....	283,247
Flatfish .....	88,818	Sea cucumber .....	6,856
Sea bream .....	25,243	Whales .....	73,320 <sup>1</sup>
Skipper .....	39,646	Seaweed .....	43,385
Cod and pollock .....	162,727	Total .....	507,175
Yellowtail .....	19,898	Grand Total .....	2,028,034

<sup>1</sup>The total whale production is computed by multiplying an average weight of 40 metric tons per whale by the number of whales caught.

totalled 2,385,919 metric tons compared with the estimated 2,827,550 tons in 1947, according to the March 19 Weekly Summary of the Natural Resources Section of SCAP.

Taking only the data from official reports of landings of marine products (estimated to be between 85-95 percent of the actual total landed), the reported catch for 1948 was 2,028,034 metric tons, 105,284 tons more than the reported catch in 1947 (estimated to be 60-70 percent of the actual total landed).

**PRESS CONFERENCE STATEMENT ON JAPANESE FISHING AREAS:** A representative of the Natural Resources Section of SCAP made the following statement on February 5, 1949, at a press conference, according to the February 5 Weekly Summary of this agency.

"Fishing areas are of great importance to the people of Japan, not only because the fish taken from these areas supply the principal part of the animal protein in their diet, but also because fishing operations in such areas provide one of the broadest fields of contact between the Japanese people and those of other nations. Many persons, in addition to fishermen, therefore, are interested in the answer to this question, 'When, if ever, will Japanese fishermen again be allowed to fish the high seas with no greater restrictions on their operations than those covering the fishermen of other nations?' This is a question which

I cannot answer at present, for the answer depends upon the performance and attitude of Japanese fishermen and of Japanese Government officials connected with fisheries.

"Present restrictions on Japanese fishing operations are connected with the behavior of Japanese fishermen before World War II. This behavior caused the



TYPICAL SMALL JAPANESE FISHING BOAT USED FOR SET-NET FISHING IN COASTAL WATERS.

people, particularly the fishermen, of other nations to distrust Japanese fishermen and the Japanese Government as being irresponsible and having no consideration for international agreements or the interests of other countries. Such convictions have led these nations to insist that Japanese fishermen be restricted so that they will not be able to endanger the fisheries of importance to these nations.

"What have the Japanese fishermen done to deserve this reputation? Let us review the record. Before World War II, Japan conducted Antarctic whaling without regard to regulations designed by the International Whaling Convention to preserve this great international resource and agreed to by all other whaling countries. Japanese whalers indiscriminately killed whales, without regard to size, sex, or number, so that this great resource would have been destroyed economically, except for the fact that World War II interrupted Antarctic whaling. Japan, too, without regard to the interests of United States, Canada, and Russia, abrogated the International Fur Seal Treaty, which had made possible the restoration of the seal herds of the North Pacific. Japanese boats also conducted clandestine salmon fishing in the Bering Sea, which endangered Alaska salmon runs that had been restored and maintained by the United States Government through extensive research and regulation.

"Since the Japanese surrender in 1945, Japanese fisheries, to a large extent, have been restored as a result of assistance supplied by the Supreme Commander for the Allied Powers and the people of the United States. Wide fishing areas have been opened to Japanese fishing operations. The area now authorized for Japanese fishing supplied 80 percent of Japanese home island fish production in the years preceding World War II. However, many Japanese fishing boat captains and owners

have refused to respect the orders from the Supreme Commander which limit fishing operations to this authorized fishing area. Japanese trawlers in the East China Sea have been particularly notorious in this respect, for although they have been warned repeatedly, many boats continue to operate from time to time outside of the authorized fishing area.

"Japanese fishermen obviously would like to be readmitted to the high seas to conduct their operations with no restrictions other than those applying to all nations. The only way these fishermen can achieve such an end is by convincing the Supreme Commander for the Allied Powers and people of other nations of these two things:

1. Japanese fishermen will respect regulations and agreements controlling their operations, whether these regulations are established by the Supreme Commander for the Allied Powers, their own government, or by international agreement.
2. Japanese fishermen and their government desire and are able to prevent over-exploitation of aquatic resources and to obtain the maximum sustained yield through adequate research and regulation.

"Such convictions cannot be created by promises and assurances. They can be fostered only by effective and continued performance. This requires that Japanese fishermen and the Japanese Government comply with and enforce the regulations on fishing operations promulgated by the Supreme Commander for the Allied Powers and the Japanese Government. This also requires that Japan develop and apply a program involving adequate research on problems of aquatic productivity and application of the results of these studies through regulations designed to maintain the productivity of aquatic resources.



HERRING UNLOADED FROM THE BOAT INTO BASKETS AT HOKKAIDO.

"The Japanese Government now is evidencing a sincere desire to conduct an effective program for detecting and punishing violations of the authorized fishing area and for solving the problems essential to the maintenance of continued productivity of aquatic resources. Certain wise and farseeing members of the fishing industry are vigorously supporting this program. These efforts deserve the full support of all people sincerely interested in the future of Japan's fisheries. Favorable

consideration of petitions for expanding the present area depends primarily on how the Japanese Government and Japanese fishermen comply with regulations governing fishing areas and the progress they make in solving the problems related to continued productivity of the aquatic resources."

RESEARCH VESSEL: The Tenyo Maru, a 225-ton vessel built at Tsurumi, Kanagawa Prefecture for the Central Fisheries Station, was recently launched. The vessel will specialize in studying bonito and tuna fisheries and oceanography, especially along the east coast of Japan.

USE OF LIGHTS IN CATCHING FISH: The use of electric lamp lures for trapping fish has been used in Japan particularly in connection with the operation of large set nets, according to the March 5 Weekly Summary of SCAP. The work is still in the experimental stage, although operations to date indicate some improvement in catches when lights are used on dark nights (See Commercial Fisheries Review, February 1949, page 48). No particular differences have been noted in the kinds of fish that are caught by the net on which lights are used, as compared with nets on which lights are not used. Experiments have been made during seasons and in areas where principally the yellowtail (a form of amberjack) have been running.

The originator of the method expects that the light lures will be especially effective during the runs of squid, as they are attracted to light. This is indicated from present methods of light fishing for squid with hand jigs.

Details on the use of lights in catching fish are:

1. The main cable and branch lines to the lamps are rubber-insulated and of 24-millimeter wire gauge.
2. The lamps are 150-watt, 100 volts.
3. The electricity is taken off a power line from shore.

WHALE MARKING PROGRAM: To study the migration habits of whales in Japanese coastal waters, the Japanese Fisheries Agency, under the supervision of the Natural Resources Section, is undertaking a program of marking whales, according to the February 26 Weekly Summary of SCAP.

Marking is done by firing a stainless steel dart from a 12-gauge shotgun into the body of the whale. The dart is a tube  $9\frac{1}{4}$ " by  $\frac{1}{2}$ " with a  $1\frac{1}{4}$ " lead tip. The following legend is engraved on the tube: "NO \_\_\_ JAPANESE FISHERIES AGENCY NO \_\_\_ TOKYO."

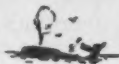
At the time of the marking, the position of the research ship and the species of whale are recorded. Later, should a marked whale be taken by a catcher boat operating from a factory ship or a land station, the location of the killing compared to the location of marking will indicate the migratory habits of the animal. Natural Resources Section will maintain a record of any reports of recovered darts, together with the date on which they were recovered, the location of the catch, and the species, sex, and length of the marked whales. Any information obtained will be disseminated through the International Whaling Commission.

The program will be initiated in the waters near the Bonin Islands in the middle of March, and upon completion of the Bonin-Island season in early May, the program will be continued in Japanese coastal waters from vessels based on land stations in northern Honshu, Hokkaido, and Kyushu. The program not only will provide information which is vital to the establishment of the level of catch in Japanese waters commensurate with best conservation principles, but will also make valuable scientific information available to the whaling nations and scientists of the world.



Though little is known of the migratory habits of whales in Japanese coastal waters, it is thought that some of the herds which appear off the Japanese coast move into the waters near Kamchatka Peninsula, Sakhalin, the Korean coast, and Formosa. If so, Russian, Korean, or Chinese whalers possibly might recover some of the darts fired by the Japanese. Information as to the date and location of such recovery would be valuable to the Supreme Commander for the Allied Powers and the Japanese Fisheries Agency.

This marking program resembles one conducted by the Discovery Committee of the United Kingdom in Antarctic waters before World War II.



### Korea

FISHERIES REVIEW, 1948: Marine products accounted for a large portion of the export trade of South Korea in 1948. Approximately \$5,000,000 worth of marine products were exported by the Government. They constituted from 33 percent to 71 percent of the monthly private trade exports. Shortages of fishery supplies handicapped operations throughout most of the year, but deliveries improved considerably during November and December. Reports indicate that 832 fishing vessels were damaged and 396 were destroyed by storms. Very few replacements were made; shortage of shipbuilding lumber handicapped repairs; and no large-scale fishing boat procurement or construction program was possible during the year.

Preliminary figures for 1948 indicate a slight decrease in marine products landings as compared with 301,952 metric tons reported for 1947, according to the International Reference Service of the Department of Commerce.

POSSIBILITIES OF INCREASING FISHERIES PRODUCTION: Fishing in Korea underwent rapid development under the Japanese, and in some years of the 1930's, when the sardine landings were high, Korea produced more than 1,750,000 metric tons, according to the report, "Economic Conditions in South Korea, 1947," issued December 1948 by the Office of International Trade, Department of Commerce. In the years following 1937, however, when sardines failed to appear in large schools as formerly, total production was considerably lower.

Production data for the fisheries of South Korea during the occupation period are incomplete, but the total landings of marine products for 1946 are reported at about 300,000 tons, with a slightly higher level indicated for 1947. The industry has been handicapped in the postwar period by shortages of boats, gear, and preservation and refrigeration facilities.

With full rehabilitation of the industry to a level of prewar production, fishery products of South Korean waters can help in increasing the indigenous food supply and also provide a major source of foreign exchange.



### Netherlands

FISHERIES REVIEW, 1948: Production and Value: The total fish production of the Netherlands during 1948 was 258,000 metric tons valued at approximately \$34,200,000,

according to a February 25 report from the American Embassy at The Hague. Of this total, 140,000 metric tons valued at approximately \$17,480,000 consisted of herring, mostly salted.

Deep-sea fishing, consisting largely of herring together with a considerable variety of other species, accounted in 1948 for some 70 percent of the total proceeds. The receipts of Ysselmeer fisheries, producing the much-prized eel, accounted for only about 19 percent of total receipts in 1948 compared to 24 percent in 1947. Coastwise fisheries, which produce shellfish mostly, accounted for about 11 percent of the 1948 total.

Prices: The general increase in prices, equivalent to nearly 6 percent, compares with an increase of 26 percent in the price of fresh sea fish and a decline of 17 percent in the fresh-water product; all the other increases being fairly close to the average.

Outlook: There are indications that in the future both Ysselmeer and coastwise fishing may decline in importance, relative to deep-sea fishing. The Ysselmeer, now a fresh-water lake, will be further reduced in area by land reclamation projects. Fishing along the North Sea coast was very productive for a time after the war, but is likely to become progressively less. The same observation applies to the area between the Ysselmeer sea dike and the Wadden Islands.

Note: Values converted on basis of 1 Dutch florin or guilder equals U. S. \$0.38.



## Newfoundland

FISHERIES REVIEW, 1948: Fresh and Frozen Fish: The fresh and frozen fish industry staged a strong revival during 1948. Total exports rose by 54 percent

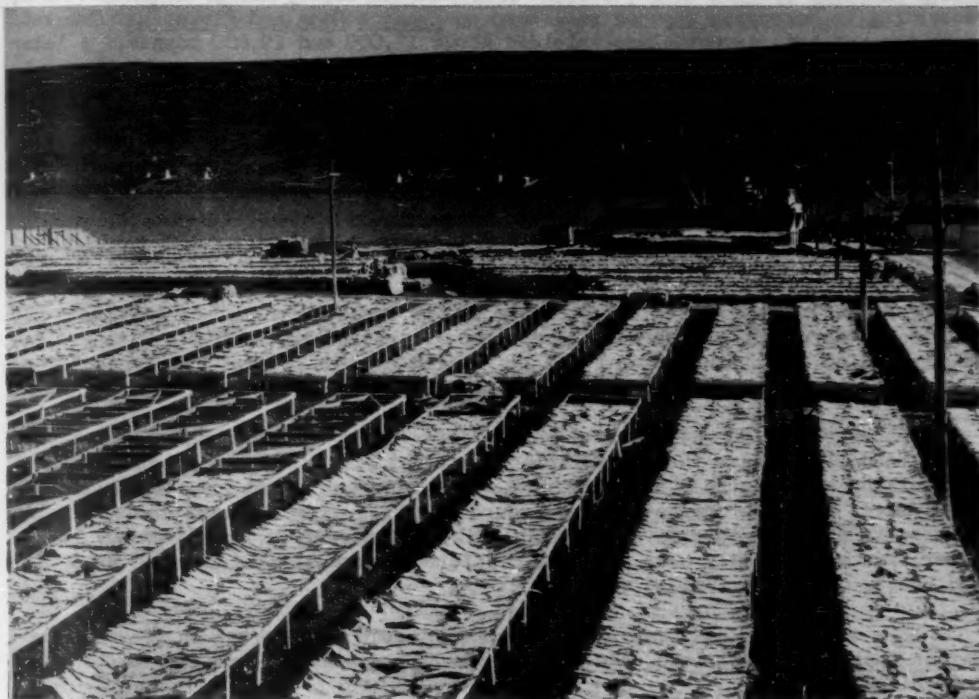
Country	1948 Lbs.	1947 Lbs.
United States .....	26,155,265	13,333,563
Canada .....	4,641,577	6,720,536
St. Pierre .....	168,780	13,525
Trinidad .....	-	44,908
Bermuda .....	-	24,660
Jamaica .....	-	8,640
United Kingdom .....	600	300
Puerto Rico .....	17,250	610
Brazil .....	-	9,670
Belgium .....	10,000	-
Total .....	30,993,472	20,156,412

from 20,156,412 pounds in 1947 to 30,993,472 pounds, according to a February 28 report from the American Consulate General at St. John's. The United States and Canada continued to be the principal markets, taking over 99 percent of total exports in both years, but there was a sharp change in the respective amounts taken by these two markets, that of the United States almost doubling while exports to Canada fell off by almost one-third.

Salt Cod Fisheries: The total 1948 production of salted cod in Newfoundland amounted to 105,280,000 pounds. This represented a drop of almost 20 percent from the 1947 production of 130,704,000 pounds. The decrease is ascribed to the exceptionally strong weather prevailing at the height of the fishing season and to the serious bait shortage.

The demand for salted cod continued good and in excess of available supply, so that market prices rose. The Newfoundland Government continued to make dollars available to cover the exports of salted cod from Newfoundland to certain sterling area markets, although ECA dollars from some countries lessened the drain on Newfoundland Government reserves.

The Government continued its policy, initiated in 1947, of making dollars available to exporters of salt cod in exchange for their sterling balances accumulated by sales to European countries.



COD BEING DRIED IN THE SUN ON "FLAKES" AT HARBOR GRACE, NEWFOUNDLAND.<sup>1/</sup>

Herring Fisheries: Various contracts were made for herring exports, but none could be filled completely, owing to the shortage of herring. The 200,000 barrel contract with the U. S. Army Procurement authorities was filled to the extent of only 109,495 barrels; another contract for 18,000 barrels of Newfoundland Scotch-cured herring drew only 9,287 barrels; a Labrador Scotch-cured herring contract for 5,000 barrels was completed only to the extent of 120 barrels; and a fourth contract for 3,000 barrels of Green Bay Scotch-cured herring also was not fulfilled. It will thus be seen that although the total exports of pickled herring totaled approximately 38,000,000 pounds as compared with 33,033,635 pounds in 1947, the catch and exports fell far short of anticipations. To start off the new year, the Fisheries Board has arranged a contract for 20,000 barrels of Newfoundland Scotch-cured herring.

Seal Fisheries: The seal fisheries were not so prosperous in 1948 as in 1947. Although the total number of seals compared favorably with last year, Newfoundland's share of the total showed a sharp drop.

Prospects for 1949: The prosperity of the cod fisheries will depend on the availability of dollars, Canadian or American, in exchange for sales to the sterling area.

<sup>1/</sup>Courtesy of Daily News, St. John's, Newfoundland.

## Norway

COD FISHED WITH DEEP-WATER PURSE SEINE: A so-called deep-water purse seine which was used for cod in the Lofoten area early in March, has given good results, according to Norwegian reports published in Fiskets Gang and Fiskaren. Two sets tore the net but, nevertheless, yielded about 13,000 and 19,000 pounds. A later set took 20,000 pounds which was sold alive to a well boat. The seine seems to be effective in moderate weather and is expected to produce from 44,000 to 66,000 pounds a set under good conditions.

The seine is reported to measure 200 fathoms by 40 fathoms and is used with a depth finder.

\* \* \* \* \*

FROZEN FISH EXPORTS COULD BE INCREASED: High commendation for Norway's "Recovery First" policy was voiced recently by the Deputy Director of America's ECA Mission to Norway in an address before members and guests of Oslo's Business Executives Club, according to an April 16 report from the Royal Norwegian Information Service.

Concentrating on the means by which Norway could increase exports—particularly to dollar areas—the speaker placed special stress on the production and publicizing of products which have hereto been exported in but limited quantities. Of Norway's present foreign exchange sources, it is expected that immediate increases in shipping incomes would be limited, and that of fish, cod liver oil, pulp, paper, and metals, only ores and metals offered prospects of increased exports—and these, only on a limited scale.

If a market can be developed, items which could be exported in greater quantities include, cod fillets, and other frozen fish products, in addition to other commodities.

GROWING HERRING OIL INDUSTRY: After the First World War, the amount of herring oil produced in Norway showed a steady increase, subject to such fluctuations as were occasioned by the yield of the fisheries, according to a March 5 report from the Royal Norwegian Information Service. During the last war, unfavorable general conditions brought about a curtailment of production and, even in the first post-war years, output remained a good deal below the prewar level as a result of the damage sustained by the fishing fleet during the war. However, the fishing fleet has now been rebuilt or repaired, and production figures are again increasing.

In the early years of the herring oil industry, the processing plants were small and old-fashioned, and the quality of the oil left much to be desired. In the interwar period, the factories were expanded and processing methods perfected, and the quality brought up to a point where the oil could be used with advantage in the manufacture of edible fats.

Just before World War II, a firm in Bergen introduced a new refining process, which made it possible to produce a liquid oil from which every objectionable taste or smell was eliminated.

This oil has found its principal use in the Norwegian canning industry, and this industry has, since the war, made exclusive use of refined herring oil for packing herring and "brisling" sardines, and in the manufacture of cod roe paste. The new processing method marks an important step towards self-sufficiency in this



particular branch of Norwegian industry. A certain amount of this oil is also sold to foreign canneries, but the prevailing shortage of edible oils and fats, and the system of allocation governing the sale of these products, have so far set definite limits to the export trade. However, this trade is expected to assume greater significance when these restraining influences have disappeared.

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**REVIEW OF THE FISHERIES, 1948:** **Production:** The total Norwegian fish production during 1948 amounted to 1,335,000 metric tons compared to 1,065,000 tons in 1947. In its four-year program to attain economic viability by 1952-53, the planned increase for fish production for the four-year period as compared with 1938 production levels is 140 percent, according to a February 10 report from the American Embassy at Oslo.

Like the preceding year, 1948 was a year of large catches considerably above the average of prewar years.

While in prewar years the cod fisheries and winter herring fisheries made up approximately 60 percent of the total annual catch, the importance of these fisheries in postwar years increased still more. In 1948, they made up 78 percent of the total catch.

The abundance of cod on Norwegian fishing grounds is less than in prewar years. No increase is to be expected prior to 1951-52, when new age classes of cod from recent years of favorable breeding conditions come to swell the schools on the fishing grounds.

The 1948 yield of the important Lofoten cod fisheries was a great disappointment. The catch was only 71,000 metric tons as compared to 146,000 tons in 1947. But the low yield must be ascribed not so much to lack of fish and abnormal behavior of the schools as to much stormy weather which prevented the fishermen from venturing out to sea.

For the country as a whole, the total 1948 catch of cod was 150,000 tons as compared to the prewar average, 1930-39, of 177,000 tons.

Table 1 - Norwegian Catch, Postwar & Prewar Years

Year	Cod <sup>1</sup> / (Metric Tons)	Herring & Sprat	Other Fish	Total
1948	150,000	1,025,000	157,000	1,335,000
1947	259,000	636,000	170,000	1,065,000
1946	214,000	511,000	130,000	855,000
1945	113,000	553,000	90,000	756,000
1930-39 Av.	177,000	605,000	153,000	935,000

<sup>1</sup>/includes cod livers and roe.

The abundance of herring on the other hand is greater now than prior to the war. In 1948, a record catch was obtained, 880,000 metric tons as compared to an average catch during the 1930's of approximately 385,000 tons. The schools came close to shore and weather conditions were unusually favorable. The greater catch in recent years must also be ascribed to the use of radio-sounding devices for locating the herring.

On account of the great quantities of herring caught in 1948, the facilities for marketing and processing were overtaxed.

The total value of the herring catch to the fishermen was \$26,357,200 compared to \$16,156,360 in 1947. Mainly on account of the record yield of the herring

fisheries, the total value of fish exports reached a new high record, \$77,059,600 for January-October 1948, as compared to \$73,840,400 for the same period in 1947.

The Fishing Fleet: The total fishing fleet now is greater than in prewar years. There is a total of 12,429 fishing boats with deck as compared to 12,290 in 1940, the year when Norway was drawn into the war. On the other hand, the average age of the boats now is greater, namely 19.1 years as compared to 17.5 years in 1940. Of the new boats being built, a greater proportion are large boats and thus the capacity of the present fleet is being steadily increased. Already, it is greater than prewar capacity.

Fishing Gear: During the first postwar years, the supply of fishing gear and tackle was entirely insufficient, a factor that detracted greatly from the efficiency of the fishing fleet. In 1947 and 1948, the supply situation has greatly improved. The annual output of new gear and tackle now considerably exceeds that of prewar years; and the new types of gear are more effective than the old.

Prices of fishing gear are stabilized at a low level by the means of Government subsidies. Such subsidies, in 1947, amounted to \$2,816,800 and in 1948, they totaled \$3,219,200.

Processing: In postwar years, considerable investments have been made in new, larger, and more diversified processing plants; \$3,420,400 were invested in such plants in 1947 and \$6,237,200 in 1948.

The utilization of the catch depends upon the size and composition of the catch. As a rule approximately half the catch is exported as fresh, frozen, salted, or dried fish.

Home consumption of fish only accounts for 11 to 13 percent. The remainder of the catch is utilized as raw material in the canning industry and in the fisheries as bait.

Processing and marketing of fish constitutes an important part of the Norwegian economy, and the effect of the size of the catch, therefore, is felt throughout the economy.

Table 2 - Norwegian Average Prices to Fishermen for all Fish, 1945-48

Year	Price Per Metric Ton
1948	\$48.89
1947	56.13
1946	51.30
1945	50.90

Of the country's total exports, fishery products made up 25 percent in 1947 and 23 percent in 1948,

Prices: The decrease in the average price of the 1948 catch as compared to that of 1947 has come about as a result of the change in composition of the catch, a much larger proportion being herring, and a smaller part being cod.

Bilateral Trade Agreements Include Fishery Products: Nearly all bilateral trade agreements throughout 1948 included fishery products (Table 3). Virtually, all agreements will be renewed or revised when they expire.

Table 3 - Norwegian Trade Agreements - 1948

Country	Period of Agreement	Amount of Norwegian Exports Under Agreement <sup>1/</sup>	
		Fishery Products	Whale Products
	Dates		
Austria	11/27/48-11/27/49	500 M.T. + \$1,609,600	-
Belgium-Luxembourg	2/21/46- 2/21/49	50,000 bbls. + \$ 804,800	-
Czechoslovakia	7/28/48- 2/28/49	12,050 M.T. + \$ 402,400	Oil: 5,000 M.T.
Denmark	4/1/46 - 3/31/49	-	Oil: 8,000 " + \$1,126,720
Finland	11/1/48 -10/31/49	10,800 M.T.	Fat: 2,000 M.T.
France	6/11/48- 6/15/49	13,700 " + \$3,219,200	-
Germany (U.S. & U.K.)	7/1/49 - 7/1/49	\$16,098,000	Oil: \$6,478,640
" (Fr. Zone)	7/5/48 -12/31/48	500 M.T.	-
" (Soviet Zone)	2/19/47-12/31/49	21,580 M.T.	Oil: 1,800 M.T.
Hungary	8/27/46-12/31/48	One-third increase of previous agreement	-
Netherlands	4/1/48 - 4/1/49	\$1,408,400	-
Poland	12/31/48-12/31/49	26,800 M.T.	Oil: 5,000 M.T.
Switzerland	6/28/48- 6/30/49	Quantities not specified	-
U.S.S.R.	12/27/46-12/31/49	33,000 M.T.	Fat: 25,000 M.T.
Yugoslavia	4/22/48- 4/30/49	-	Oil: \$ 221,000

<sup>1/</sup>Norway in return imports various commodities (no fishery products). All amounts are for a period of approximately one year.

Note: Conversion of values based on exchange rate of 4.97 Norwegian kroner equals \$1.00 U.S.

**WHALING, 1947-48:** In postwar years the Norwegian whaling industry has aimed at restoring the Norwegian whaling fleet to its prewar size. The Government has discouraged any further expansion because it would result in excess capacity and poor economy, on account of the limited stock of whales in Antarctic waters and the international agreements restricting pelagic whaling in those waters.

For the season 1945-46, Norwegian production of whale oil accounted for 63 percent of the total production by whaling expeditions of all nationalities taking part in pelagic whaling in Antarctic waters. Both in 1946-47 and 1947-48, Norwegian production was very close to 50 percent of the total (See Commercial Fisheries Review, June 1948, p. 39).

For the season 1947-48, two new floating factories had been added to the Norwegian whaling fleet while the number of vessels of the expeditions of other nationalities remained unchanged.

Table 1 - Norwegian Production of Whale Oil

Season	Production (Metric Tons)
1947-48.....	175,000
1946-47.....	163,000
1945-46.....	86,800
1936-37-1938-39	154,400

Table 2 - Number of Vessels in Norwegian Whaling Fleet

Season	Floating Factories	Catcher Boats
1948-49	10	106
1947-48	9	91
1946-47	7	57

Personnel on the Norwegian whaling fleet in 1947-48 totaled 3,560 men. Besides, 2,445 Norwegians were employed in whaling vessels of other nationalities.

Prices for whale oil of Norwegian production for the three seasons 1945-46 to 1947-48 were as follows: \$270, \$403, and \$443 per metric ton, respectively

The total catch of whales in Antarctic waters is limited and the Norwegian whaling fleet has more than sufficient capacity to acquire the number of whales normally obtained by Norwegian vessels. Therefore, it is expected that future production policy in the whaling industry will emphasize improved utilization of

whales, that is, greater production of frozen whale meat, tankage, whale meat meal and extraction of vitamins and biologics from the liver and glands of the whale.

Note: Conversion of values based on exchange rate of U. S. \$4.03 equals one British pound.



## Peru

**FISHERIES REVIEW, 1947: Employment:** The Peruvian Ministry of Marine reports that as of December 31, 1948, there were 5,850 fishermen registered in Peru, of

which 1,365 fishermen were registered in the port of Callao, according to a January 13 report from the American Embassy at Lima.



CALLAO - ONE OF PERU'S PRINCIPAL FISHING PORTS.

The Bureau of Fisheries, Ministry of Agriculture, estimates that at the end of 1948, there were approximately 2,000 persons employed in the fish canning industry. The same source reports that, in 1947 and 1948, earnings of Peruvian fishermen averaged about 5,000 soles each, per year; while wages paid in fish canning plants were 3.50 soles (ap-

proximately 54 cents) per day for unskilled laborers, and from 5 to 20 soles (approximately \$.77-\$3.08 daily for skilled laborers. The regular working hours in the fish canning industry remained unchanged in 1946-48 at 8 hours per day, but occasionally, the plants worked 12 and 16 hours with overtime paid at the rate of  $1\frac{1}{2}$  times the regular wage.

**Fishing Vessels:** Trade sources report that, in the last three years, there have been added to the Peruvian fishing fleet about 70 locally-built boats, 36-45 feet long, most of which are capable of purse-seining, and, in addition, two refrigerator boats of U. S. registry operating in Peruvian waters. Purse seining is reported to have developed considerably for fishing bonito and tuna, but gill-nets and trolling are still used to a large extent.

**Production:** The production of fish in 1947 amounted to 67,712,066 pounds compared to 60,845,972 pounds for 1946 (Table 1). For the first six months of 1948, the catch was 36,199,533 pounds.

The principal fishing ports are Callao, Ilo, Paita, and Sechura. In 1947, Callao accounted for 34.4 percent of the total landings; Ilo, 12.7 percent; Paita, 8 percent; Sechura, 6.9 percent; Pucusana, 4.1 percent; Chancay, 3.6 percent;



Supe, 3.5 percent; and the balance of 34.8 percent divided among the ports of Chimbote, Huacho, Pimentel, Samanco, Pacasmayo, Cabo Blanco, San Jose, Talara, Lobitos, Mollendo, Pisco, and Huanchaco.

Table 1 - Peruvian Fish Catch by Principal Species - 1946-47

Principal Species	1947		1946	
	Lbs.	% of Total	Lbs.	% of Total
Bonito .....	35,275,253	52.1	32,463,614	53.4
Caballa (Mackerel) .....	5,506,547	8.1	6,217,312	10.2
Cojinoha (Pompano) .....	5,203,029	7.7	4,372,419	7.2
Lorna (Drum) .....	2,380,763	3.5	1,502,875	2.5
Cabrilla (Sea bass) .....	2,161,069	3.2	1,950,516	3.2
Albacora (Albacore) .....	2,118,976	3.1	1,142,467	1.9
Atun (Tuna) .....	1,869,419	2.8	2,997,544	4.9
Corvina (Sea bass) .....	1,327,984	2.0	788,801	1.3
Tollo (Dogfish) .....	1,169,500	1.7	1,363,514	2.2
Peje-blanco (Whitfish) .....	1,149,487	1.7	795,839	1.3
Machete (Herring) .....	923,985	1.4	634,962	1.0
Robalo (Drum) .....	911,343	1.3	808,020	1.3
Sierra (King mackerel) .....	849,922	1.3	551,859	0.9
Ayunque (Drum) .....	716,768	1.1	371,890	0.6
All others .....	6,148,021	9.0	4,877,400	8.0
	67,712,066	100.0	60,845,972	100.0

Production of Canned Tuna and Bonito: Trade sources estimate that the total production of canned bonito and tuna in oil during July 1947-June 1948 was approximately 350,000 cases<sup>1/</sup> compared with about 300,000 cases in 1946-47, and approximately 200,000 cases in 1945-46.

Prices: The Bureau of Fisheries reports the prices paid to fishermen by canneries for tuna and bonito in the ports of Callao and Ilo, two major fishing ports in which there is an official price control (Table 2).

Table 2 - Prices<sup>1/</sup> Paid Fishermen by Canneries for Tuna & Bonito, 1946-48 at Ilo & Callao

	ILO				CALLAO	
	(\$ per 100 lbs.)				(\$ per dozen fish)	
	1948	1947	1946	1948	1947	1946
Bonito <sup>2/</sup> .....	(2nd Half) \$1.08 <sup>1/2</sup>	(1st Half) \$.80 <sup>1/2</sup>				
Tuna .....	1.15 <sup>1/2</sup>	1.12	1.11	1.08	\$1.38 <sup>1/2</sup>	\$1.08-1.38 <sup>1/2</sup>
					(Not landed)	

<sup>1/</sup>Based on official rate of exchange - 6.485 soles per U.S. \$1.00.

<sup>2/</sup>Average weight of a bonito: landed at Ilo, 7.7 lbs.; landed at Callao, 7.3 lbs.

Number of Plants Canning Bonito and Tuna: According to the Bureau of Fisheries and reliable trade sources, there are, at present, in Peru 23 plants actively engaged in catching bonito and tuna. Of this total, 7 plants are reported to be capable of producing 1,000 or more cases of 48  $\frac{1}{2}$ -pound cans in 8 hours. Nineteen were installed and started operations after 1945.

Export Duties: The Peruvian Government assesses the following export duties and surcharges on canned tuna and bonito:

Ten percent ad valorem tax<sup>2/</sup> on the difference between cost price (fixed by law at U.S. \$425.00 per short ton of 907 kilos 184 grams, net weight) and the consular invoice value (Law 10545 of April 16, 1946).

<sup>1/</sup>About 90 percent is said to correspond to cases containing 48 7-oz. tins.

<sup>2/</sup>Payable in soles at the official rate of exchange.

Ten percent additional export tax<sup>2/</sup>, payable when the consular invoice value exceeds by 25 percent the base fixed price (Law 9466 of December 18, 1941). This tax is assessed, according to Allao Customhouse, on the difference between the fixed cost price (U.S. \$425.00) and the export value as shown on the consular invoice, minus one-fourth of the cost price.

One percent ad valorem Pro-Unemployed tax,<sup>3/</sup> (Law 7540 of June 30, 1941)

U.S. \$1.60<sup>2/</sup> per metric ton of weight or measurement (Supreme Decree of September 22, 1944).

\$/2.00 per metric ton of weight (Law 10811 of March 3, 1947).

<sup>2/</sup>Payable in soles at the official rate of exchange.

<sup>3/</sup>45 percent of the tax payable in soles at the official rate of exchange, and 55 percent payable in soles at the free-market rate of exchange.



## Republic of the Philippines

**EXPERIMENTAL FISHING FLEET:** The three exploratory vessels of the U. S. Fish and Wildlife Service's Philippine Fishery Program returned to port early in March from voyages to different parts of the Philippines, according to an announcement made by the Administrator of the Program and the Director of the Philippine Bureau of Fisheries.

The Spencer F. Baird, oceanographic research vessel, returned from a trip from Sibuyan and Visayan Seas where the first oceanographic data ever taken in



SPENCER F. BAIRD, PHILIPPINE FISHERY PROGRAM RESEARCH VESSEL.

those waters were collected. The investigators aboard reported unusual conditions in several places but they were particularly intrigued by the evidences of stagnation in the bottom of Ragay Gulf. The data collected but not yet analyzed indicate a relatively shallow sill near the mouth of that area which limits circulation of water with the outside. A profound effect on the fishing potentiality of that area is indicated. The vessel departed late in March for the Sulu Sea to continue the collection of oceanographic data.

The David S. Jordan came in from a trip to Lingayen Gulf where investigations were made of otter-trawl grounds, and demonstrations were made of the otter-trawl gear to interested parties in the provinces bordering that area. Preliminary reports indicate that Lingayen Gulf could support a small fleet of otter trawlers with profit to the operators. Following minor repairs and taking on stores, the vessel proceeded to the South about the middle of March.

The Theodore N. Gill returned from a voyage in the Northern Sulu Sea where experiments were carried out with various adaptations of the long-line trawl pre-

paratory to an extensive voyage planned in the near future to the southernmost part of the Philippine seas for tuna. At the end of the month, she departed for the Sulu Sea and will work down the Sulu archipelago as far as Tawi-Tawi and the vicinity of the Turtle Islands. Some otter trawl hauls will be made in the latter area where conditions appear to be favorable.



THEODORE N. GILL, PHILIPPINE FISHERY PROGRAM RESEARCH VESSEL.



## Turkey

**EXPANSION OF FISHING INDUSTRY:** Evidence of the Turkish Government's desire to encourage expansion of the fishing industry was revealed by the completion of a fisheries bill, according to an April 5 American consular report from Ankara. The extent to which the Government will participate in this field is not known, but the bill is based on the belief that the potentialities for a greatly enlarged industry are considerable.

Turkey's exports of fish amounted to approximately 6,000 metric tons in 1948.



## Union of South Africa

**SARDINES ADDED TO LIST OF PROHIBITED IMPORTS:** Import controls and exchange restrictions, which were imposed in November 1948 by the Union of South Africa, have been extended effective March 4, 1949, to include sardines, according to a report in the March 12 Foreign Trade of the Canadian Department of Trade and Commerce. Sardines were excepted under the previous order which included "fish: other, except sardines." (See Commercial Fisheries Review, February 1949, page 64).



## United Kingdom

**CANNED WHALE MEAT:** The first shipment from the Antarctic of 1,000 metric tons of whale meat canned within six hours of capture arrived in Great Britain aboard the Ketos, the latter part of March, according to the April 2 issue of the British periodical, The Fishing News. The refrigerated steamer, Ketos, owned by an English whaling company, also discharged 3,734 metric tons of whale meat extracts, meat, meal, and other whale products. This vessel was one of the expedition of 22 ships, including another refrigerated ship, besides the factory ship (Balaena), and a floating cannery.

The captured whales were processed on board the Balaena, then transferred to the floating canning factory vessel, Thule, where the meat was canned. This is the first whale canning ship in operation.

The S. S. Thule, a 10,000-ton tanker, which sailed from Liverpool for the South Atlantic on October 24, 1948, has been hitherto employed in carrying fuel oil to the fleet of United Whalers, Ltd., returning to its base loaded with whale oil. This year a complete canning plant was installed in the forepart of the vessel.

Most of the frozen whale meat, also brought to Britain by the Ketos, is to be canned in England, much of it in the form of the new whale meat roll which has already made its appearance in the shops.

According to an official of the English whaling company, the whale cannery venture was an experiment, and there are a number of difficulties to overcome. Whether or not the operation would be developed in the Antarctic or the meat brought back to be canned depends on what the data of the experimental operation reveals.

\* \* \* \* \*

GRIMSBY—LEADING FISHING PORT IN NORTH ATLANTIC: Grimsby, England, is the leading fishing port among the North Atlantic ports. During 1948, it handled an average of 12.1 million pounds of fish a week, according to a note in the April 2 issue of the British periodical, Fish Trades Gazette. This was 4.4 million pounds per week above prewar years.

The landings at the two ports of Grimsby and Hull in 1948 totaled nearly a half million metric tons (1.1 billion pounds) or 47 percent of the total landings of fishery products in England and Wales.

\* \* \* \* \*

MINISTRY OF FOOD STANDARDS FOR PRODUCTION OF QUICK-FROZEN FISH: The policy of the British Ministry of Food is to encourage the quick freezing of fish and to grant special allocations of fish for this purpose to those merchants who are equipped to produce quick-frozen fish according to the standard prescribed by the Ministry. Since the introduction of this policy in 1946, the quick freezing of fish has developed steadily, according to a December 10 report from the American Embassy at London. The future of the industry depends on the high standard of its production. The ideal conditions needed for the production and distribution of quick-frozen fish, and the present conditions with which quick freezers must comply before they receive allocations of white fish are as follows:

- (1) The ideal conditions for the production and distribution of quick-frozen fish.
  - (a) Only fresh fish of best quality should be frozen.
  - (b) The delay between catching and quick freezing the fish should be as short as possible.
  - (c) The fish should be frozen at such a rate that the time taken to cool the fish from 32° F. to 23° F. does not exceed 2 hours and the temperature of the fish leaving the freezing plant should not exceed 0° F.
  - (d) The frozen fish should be carefully "glazed" by immersion in or by spraying with cold water and/or sealed in moisture and vapor-proof wrappers.
  - (e) The fish should be stored at uniform and adequately low temperatures as follows:

WHITE FISH

Storage up to 4 months. Not higher than 5° F.  
Storage up to 8 months. Not higher than 20° F.



## FATTY FISH

Storage up to 3 months. Not higher than 5° F.  
Storage up to 6 months. Not higher than 20° F.

## (2) Present conditions which quick freezers must satisfy.

Although quick freezers should aim at satisfying the conditions set out in (1) above, the Ministry realizes that it may be difficult to comply with all of them at the present time. In the meantime, allocations of white fish for quick freezing will continue to be granted provided that:

- (a) The plant is capable of cooling the fish from 32° F. to 28° F. in not more than 2 hours either when dealing with whole fish separately or in regularly shaped packs, or with packages of fillets in molds, cardboard boxes or normal light wrappings of cellulose film, waxed paper, etc.
- (b) When removed from the quick freezing plant no part of the fish is at a temperature higher than +10° F.
- (c) Cold storage accommodation at -10° F. or below is available on the same premises as the quick freezing plant, or, where it is not at present possible to comply with this condition, alternative arrangements are provided which have been approved by the Ministry.

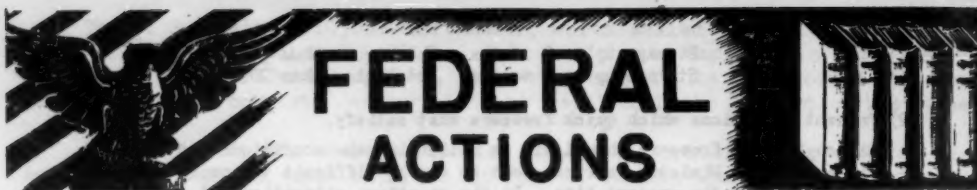
The quantity of fish allocated for quick freezing in any plant will be based upon the time taken to cool every part of a batch of fish from the temperature of the fish as delivered to the plant to at least +10° F., when the plant is operating under normal conditions.



## Venezuela

CONSTRUCTION OF FIRST PRIVATE SHIPYARD: In construction for slightly over one year, the first privately-owned shipyard in Venezuela is nearing completion in Puerto Cabello, according to a February 14 report from the American Embassy at Caracas. It is estimated that the total cost is \$240,000-\$270,000. Of this amount, \$45,000 was furnished as a loan by the Government-owned Venezuelan Development Corporation in furtherance of its current campaign to revitalize and expand the Venezuelan fishing industry. The new shipyard includes a machine shop, carpenter shop, supply warehouse, and drydock, and will be able to handle boats up to 300 gross tons.





## Department of the Army

FISHERY PRODUCTS PROCUREMENT AND EXPORTS TO OCCUPIED AREAS: As of April 1, under working agreement covering purchase responsibility, the Office of the Quartermaster General has been designated as the procurement agency for the procurement of food (including fishery products) out of Government-appropriated funds for feeding the civilian populations of Western Germany, Japan, and the Ryukyus, according to the Office of Food Administrator for Occupied Areas, Department of the Army.

Offers of fishery products and requests for listing as permanent bidders should be submitted by U. S. Suppliers to the Quartermaster Purchasing Office (QM), 1819 West Pershing Road, Chicago 9, Illinois.

U. S. Appropriated Funds: The Department of the Army is charged with administrative responsibility for the expenditure of funds appropriated by the Congress of the United States for feeding the civilian populations of Western Germany, Japan, and the Ryukyus. Within the Department of the Army, the Officer of the Food Administrator for Occupied Areas (FAOA) approves import requirements for these areas and makes funds available to various purchasing agencies for actual physical procurement.

European Recovery Program: Procurement of fishery products in the United States for Western Germany, Austria, and Trieste with ERP funds under the annual programs as approved by ECA is carried out by the Office of the Quartermaster General.

Food Supplies for Occupation Forces: All food for Army personnel is purchased by the Quartermaster Corps through established trade channels. Prospective suppliers should communicate with the Quartermaster Purchasing Office in Chicago.



## Department of Commerce

EDIBLE FISH AND SHELLFISH PRODUCTS REMOVED FROM EXPORT CONTROL: A revised list of commodities exportable under general license GRO has been issued by the Office of International Trade of the Department of Commerce. This revised list, which became effective April 29, 1949, contains a substantial number of additions to the previous one. Included are all edible fish and shellfish and their products.

371.8

## GENERAL LICENSE GRO

## (a) Scope of Licenses

A general license designated GRO is hereby established authorizing the exportation to all destinations of certain commodities not included on the Positive List of Commodities (Part 399) but set forth in paragraph (b) of this section.

## (b) Commodity List

The following specified commodities may be exported under the provisions of this general license GRO to all destinations:

## Commodities Exportable Under General License GRO

Dept. of Commerce Schedule B No.	Commodity
007000-007109	Fish and fish products: Fish, fresh or frozen, whether or not whole (include fillets).
007200-007609	Shellfish, fresh or frozen (include raw and fresh-cooked shellfish and shellfish meats).
007700-007998	Fish, salted, pickled, or dry-cured.
008001, 008005	Shellfish, pickled, salted, or dry-cured.
008101 .....	Fish, smoked or kippered.
008400-008650	Fish, canned.
008700-008898	Shellfish, canned.
008995 .....	Fish, prepared or preserved, n.e.s. (include cakes, balls, paste, sauce, caviar, and roe).
008998 .....	Shellfish, prepared or preserved, n.e.s.
009900 .....	Edible animal products, n.e.s.: Edible terrapin; frog legs; snails; turtle meat; whale meat.
099920 .....	Other inedible animals and products:
099998 .....	Shells, unmanufactured.
	Animal products, inedible, n.e.s.: cuttlefish bone; fish eggs, hatching; fish essence; fish scales; fish sounds; halibut viscera; pearl essence; pearly paste; salmon milt for breeding; squid bait, frozen; trout eggs, hatching.
	Miscellaneous commodities, n.e.s.:
971290 .....	Buttons, and parts: Pearl or shell buttons.
971300 .....	Button parts, backs, blanks, or molds (all materials).
984900 .....	Fishing tackle and equipment suitable only for com- mercial fishing.

These commodities do not require a validated license for exportation to any destination.

Only the commodities classified under the Schedule B numbers in the left-hand column, and as restricted in the commodity descriptions, may be exported under general license GRO.



## Department of the Interior

## FISH AND WILDLIFE SERVICE

**AMENDMENTS TO ALASKA COMMERCIAL FISHERIES REGULATIONS:** The Federal Register of May 12, 1949, carried two amendments to the Alaska commercial fisheries regulations. Amendment to Section 102.28 is made in order to require a more practical yet effective means of closing salmon traps to fishing. Amendment to Section 122.5 provides that the North Behm Canal section shall have a salmon fishing season consistent with adjoining districts.

1. Section 102.28 is amended to read as follows:

§ 102.28 *Method of closing salmon traps.* During all periods when fishing is prohibited, the heart walls of salmon traps shall be lifted or lowered in accordance with the method prescribed by section 5 of the act of June 6, 1924, and the tunnels from hearts to pots shall be closed in the following manner:

(a) *Floating traps.* Poles shall be permanently secured to the webbing at each side of the mouth of the pot tunnel and shall extend from the tunnel floor to a height at least two feet above the water. A draw line shall be reeved through the lower ends of both poles and the top of one, and the upper end of this line shall be spliced to a length of chain. The two tunnel walls must be overlapped as far as possible across the pot gap and the draw line must be pulled tight so as to completely close the bottom of the tunnel. The pole on the right side of the pot gap, as viewed from the shore, must be painted bright red above water and the pole on the left bright green. Serially numbered seals issued by the Fish and

Wildlife Service shall be affixed around the top rib lines and webbing of both tunnel walls next to each pole and a link of the chain must be included in one of the seals. Seals must be attached in such manner that the trap cannot be fished without breaking them.

(b) *Stationary traps.* A draw line shall be secured to the pot wall at a depth equal to that of the bottom of the tunnel and at least 12 inches from the edge of the pot gap; shall be reeved through rings fastened at intervals of 4 feet or less on the vertical rib line along the mouth end of the opposite tunnel wall; and shall be spliced at its upper end to a length of chain. The tunnel shall be pulled to one side of the pot gap sufficiently to overlap the pot wall a minimum of 12 inches and the draw line shall be pulled tight and secured by looping its chain around the capping. Serially numbered seals issued by the Fish and Wildlife Service shall be affixed, one to seal the tunnel webbing to the pot wall and another to seal the loop of chain around the capping. Seals must be attached in such manner that trap cannot be fished without breaking them. (43 Stat. 465; 48 U. S. C. 225)

2. Section 122.5 is amended to read as follows:

§ 122.5. *Open season, central, southwest, southeast, and north Behm Canal section.* Fishing, other than trolling, in the central, southeast, southwest, and north Behm Canal sections is prohibited except from 6 o'clock antemeridian August 15 to 6 o'clock postmeridian September 3: *Provided*, That this prohibition shall not apply in Cholmondeley Sound from 6 o'clock antemeridian October 5 to 6 o'clock postmeridian October 15. (44 Stat. 752; 48 U. S. C. 221)

The salmon fishing season in Alaska, as it affects certain salmon traps, opens on May 27. Accordingly, in order that a practical closure method may be made applicable to such trap operations it has been determined that the amendment to § 102.28 shall become effective on May 27, 1949. The amendment to § 122.5 shall become effective 30 days after publication in the FEDERAL REGISTER.

(43 Stat. 465, as amended; 48 U. S. C. 221 et seq.)

Dated: May 4, 1949.

[SEAL]

J. A. KRUG,  
Secretary of the Interior.

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**ALASKA HERRING CATCH QUOTAS:** On April 7, 1949, the Secretary of the Interior issued 1949 catch limitations for the Alaska herring fishery. The quotas published in the Federal Register of April 14, 1949, were issued as amendments to the Alaska commercial fishery regulations, authorized by a Congressional Act of June 18, 1926. The provisions of the amendments become effective 30 days after their publication in the Federal Register.

Herring Catch Quotas for Alaska, 1949		
Area	1949	1948
	(250-lb. bbls.)	
Southeastern Alaska ...	200,000	400,000
Iodiak Island .....	250,000	390,000
Prince William Sound- Resurrection Bay .....	150,000	180,000

The new catch limitations have been revised downward for the first time since drastic quota restrictions were imposed in 1942 to rebuild Alaska's depleted herring fishery.

Because of the reduced catch limitation for Southeastern Alaska, the Territory's oldest and most productive herring fishery, the Service believes that some reduction plants and boats will not operate this season.

The legal herring seasons run from June 10 to October 15, varying in each quota area.



Service biologists, who determine catch quotas by scientific studies of the abundance of the age groups in each year's herring catch, expect an unusually low run of mature herring in Alaskan waters this season because of several years of unsuccessful spawning.

\* \* \* \* \*

LEGAL PROTECTION PARTIALLY REMOVED FOR ALASKA SEA LIONS: On April 7, 1949, the Secretary of the Interior removed the legal protection of sea lions in Alaskan waters, except in waters around Bogoslof Island in the Bering Sea. In accordance with a Congressional Act of June 16, 1934, the Secretary retained full legal protection of the sea lions in the waters around uninhabited Bogoslof Island.

The provisions of the amendment were published in the Federal Register of April 14, 1949, and read as follows:

142.1 Killing of sea lions. The killing of sea lions in the Territory of Alaska, or in any of the waters of Alaska over which the United States has jurisdiction is permitted, except on Bogoslof Island and within one statute mile of the shores of Bogoslof Island. (48 Stat. 976; 16 U.S.C.659)

The killing of sea lions in Alaskan waters has been prohibited by regulations issued by the Secretary of the Interior, July 1, 1941. The old law did permit killing, however, "by natives for food or clothing, and by miners and explorers when in need of food...by anyone in the necessary protection of property, or while such animals are destroying salmon or other food fish," and by authorized scientists.

The Service will soon begin sea lion control operations in certain areas to curb the predations on commercial fishes. Although sea lions have practically no economic value now, the Service also seeks commercial uses for the animals.

Huge herds of sea lions concentrate on Alaska's important halibut fishing banks and salmon trolling grounds, causing heavy economic losses to the Territory's fishermen. According to the Service's findings, the enormous marine mammals, which have become unusually abundant in recent years, feed on commercial fishes caught in nets and on baited hooks.

The Alaskan sea lions are relatively non-migratory, and are much larger than the California sea lions which are captured for use as "trained seals."



### Interstate Commerce Commission

#### MEANING OF "FISH (INCLUDING SHELL FISH)" IN INTERSTATE COMMERCE ACT CLARIFIED:

The Interstate Commerce Commission through an order dated April 11, 1949, reopened for further consideration its Docket MC 89207, better known as the "Monark Egg Case." The Commission ordered one of its examiners to prepare a report solely with respect to the meaning of the term "fish (including shell fish)" as used in section 203 (b) (6) of the Interstate Commerce Act.

In earlier proceedings under this Docket "fish (including shell fish)" was defined by the Commission as meaning only fish dead or alive in the form that they came from the water. This meant that relatively few shipments of fishery products transported by truck could be carried by trucks unregulated by the Interstate Commerce Commission.

As the result of the order of April 11, an examiner has now filed a report which recommends "that the term fish (including shell fish) as used in section 203 (b) (6) of the act includes frozen, quick-frozen, and unfrozen fish in the various forms in which it is customarily shipped, such as live fish, fish in the round, beheaded and gutted fish, filleted fish, beheaded shrimp, and oysters, clams, crabs, and lobsters, with or without shells (including crab meat and lobster meat)." This would grant a broad exemption to shipments of fresh and frozen fishery products and allow all of these shipments to be made in unregulated trucks provided that these trucks did not carry for compensation any passengers or property other than exempt property as defined in section 203 (b) (6) of the Interstate Commerce Act and subsequent decisions of the Interstate Commerce Commission.

Exceptions to this report could be filed through May 13, 1949, on which date two exceptions were received by the Commission. Replies to these exceptions could be filed until midnight May 23. The examiner's report together with the exceptions and any replies will be reviewed by the Commission and a final report issued.



## Department of State

FURTHER DECLARATION OF U. S. POLICY ON TERRITORIAL WATERS:<sup>1/</sup> In a letter replying to an inquiry from a private company, the United States Department of State made the following statement with reference to the United States policy towards the declarations of other nations as to the limits of and jurisdiction over territorial waters:

"One of our principal concerns in the tuna area of Latin America is to see that no impediment is placed in the way of United States fishermen participating in the harvesting of the tuna resources in this area, within the limits of the rights they have under international law as citizens of the United States.

"Under generally accepted principles of international law, the vessels of any nation have the right to fish on the high seas without interference by the public vessels of any other nation. Accordingly United States fishing vessels may freely operate off Western Latin America, so far as control by other nations is concerned, up to the limits of the territorial waters of such other nations. The United States has never recognized territorial waters jurisdiction by any country in this area beyond three marine miles from low-water mark on the coast of such country. Accordingly, under the policy of this Government concerning the extent of territorial waters, United States fishing vessels have the right to carry on operations in waters beyond three miles from land without interference from the contiguous country.

"This simple situation is somewhat complicated by the fact that this Government stands ready at all time to undertake any measures within its powers to conserve fishery resources to the end that these resources will continue to produce at the maximum level year after year. If regulation of fishing activity is necessary to accomplish this end, we are willing to place our fishermen under the same regulation as the fishermen of other nations are under on that particular fishing ground--with the provision that this Government will have an equal voice with any other Government in formulating those regulations.

"In order to determine when regulations in any particular fishery are required for conservation purposes we are willing to join in scientific investigations designed to place the regulations on a factual basis, and,

of course, to pay our share of costs of such investigations. You are acquainted with the two joint commissions we have with Canada in the Northwest, on salmon and halibut.

"We have recently signed a convention with eleven other nations to set up another such Commission to work on the fisheries of the Northwest Atlantic. On January 25 we signed a similar convention with Mexico to set up such a commission to cover the tuna fisheries common to the two countries.

"We distinguish quite clearly, however, between regulation for the purpose of conservation and regulation for the purpose of raising revenues.

"Regulation of the activities of our fishermen on the high seas by another country for the purpose of raising revenue for that country would not be acceptable to this Government.

"Sincerely yours,

"W. M. Chapman  
Special Assistant to the  
Under Secretary"

1/ See Commercial Fisheries Review, January 1949, page 50.



## Eighty-first Congress (First Session)

APRIL 1949

### PUBLIC BILLS AND JOINT RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES:

Listed below are all the public bills and joint resolutions introduced and referred to committees and passed by the Eighty-First Congress during April 1949 which affect in any way the fisheries and fishing and allied industries. The bills are listed in the order in which they were introduced:

#### House of Representatives:

H. R. 4170 (Nixon) - A bill to confirm and establish the titles of the States to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 4198 (Nelson) - A bill to provide for nautical education in the territories, to facilitate nautical education in the States and Territories, and for other purposes; to the Committee on Merchant Marine and Fisheries.

H. R. 4205 (King) - A bill to give effect to the convention between the United States of America and the United Mexican States for the scientific investigation of tuna, signed at Mexico City January 25, 1949, and for other purposes; to the Committee on Foreign Affairs.

H. R. 4228 (Furcolo), (by request) - A bill to establish a Connecticut Valley Authority to provide for unified water control and resource development on the Connecticut River, its tributaries and watershed, to prevent floods, encourage agriculture, stimulate industrial expansion,

develop low-cost hydro-electric power, promote navigation, increase recreational possibilities, protect wildlife, and for other purposes; to the Committee on Public Works.

H. R. 4249 (Colmer) - A bill to transfer the trawlers Alaska and Oregon from the Reconstruction Finance Corporation to the Fish and Wildlife Service; to the Committee on Merchant Marine and Fisheries.

H. R. 4252 (Thompson) - Same as H. R. 4249; to the Committee on Merchant Marine and Fisheries.

H. R. 4272 (Lucas) - A bill to provide for the amendment of the Fair Labor Standards Act of 1938, and for other purposes; to the Committee on Education and Labor.

H. R. 4276 (McKinnon) - Same as H. R. 4205; to the Committee on Foreign Affairs.

H. R. 4286 (Mitchell) - A bill to reorganize and consolidate certain Federal functions and thereby secure their more effective administration by establishing a Columbia Valley Administration to assist in the achievement of unified water control and resource conservation and development on the Columbia River, its tributaries, and the surrounding lands; to the Committee on Public Works.

H. R. 4287 (Jackson of Wash.) - Same as H. R. 4286; to the Committee on Public Works.

H. R. 4296 (Doyle) - Same as H. R. 4276; to the Committee on Foreign Affairs.

H. R. 4403 (Peterson) - A bill to facilitate the administration by the Secretary of the Interior, in cooperation with other Federal, State, and local agencies, of the recreational uses of lands and waters within reclamation, flood-control, power, and other Federal reservoir projects; to the Committee on Public Lands.

H. R. 4450 (Hart) - A bill to extend the requirements for fixing the minimum number of deck officers on steam vessels to certain additional vessels of the United States, and for other purposes. This bill states in part: "Nothing contained in this Act shall apply to fishing vessels of less than three hundred gross tons, or to fishing vessels of any gross tonnage which do not, in the course of their normal employment, navigate more than fifty miles from the shores of the continental United States, including Alaska," to the Committee on Merchant Marine and Fisheries.

#### Senate:

S. 1545 (McCarran, for himself and 30 other Senators) - A bill to confirm and establish the titles of the States to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on Interior and Insular Affairs.

S. 1595 (Cain) - A bill for approving plans for the development of the Columbia River Basin, and for other purposes; to the Committee on Public Works.

S. 1642 (Knowland, for himself and Downey) - A bill to give effect to the convention between the United States of America and the United Mexican States for the scientific investigation of tuna, signed at Mexico City, January 25, 1949, and for other purposes; to the Committee on Foreign Relations.



S. 1645 (Magnuson, for himself and 17 others) - A bill to reorganize and consolidate certain Federal functions and thereby secure their more effective administration by establishing a Columbia Valley Administration to assist in the achievement of unified water control and resource conservation and development on the Columbia River, its tributaries, and the surrounding lands; to the Committee on Public Works.

S. Res. 99 (O'Connor): Directs the Secretary of State to investigate and report to the Senate, within 60 days of the adoption of this resolution, the costs of production of producers and processors of fish and fishery products, wages, and other remuneration paid to fishermen, shore workers, and all other labor engaged in the production of fish and fishery products in each nation exporting fish and shellfish and all byproducts thereof to the United States, together with a description of the standard of living enjoyed by the persons employed in the fisheries under the jurisdiction of such governments.

The U. S. Tariff Commission to initiate an immediate investigation of the imports of fresh and frozen groundfish fillets.

The Secretary of Treasury to ascertain all subsidies, grants, and bounties of any kind whatsoever paid directly or indirectly by any foreign country or any citizen thereof presently exporting fish or fishery products to the United States, to any fishermen, producers, or processors of fish or fishery products within the territorial jurisdiction of such country.

#### BILLS, RESOLUTIONS, ETC. PASSED, AND OTHER ACTION:

##### House of Representatives:

H. Res. 147 (Thompson) - Considered, amended, and agreed to April 4, 1949. Resolved, That the Secretary of State be, and he hereby is, requested to cause an immediate study to be made of the effect on the domestic fishing industry of increasing imports of freshwater and saltwater fresh and frozen fish, especially groundfish, fillets, into the United States, and report to be submitted to the House of Representatives not later than May 15, 1949.



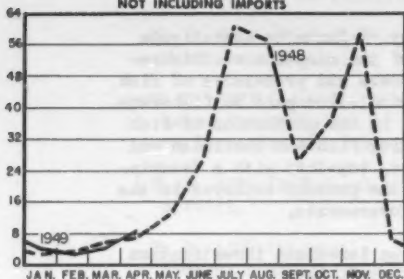
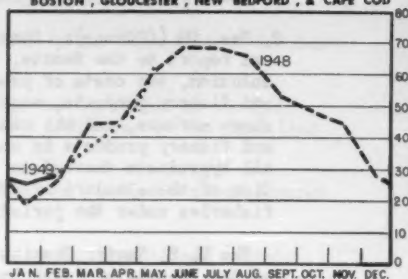
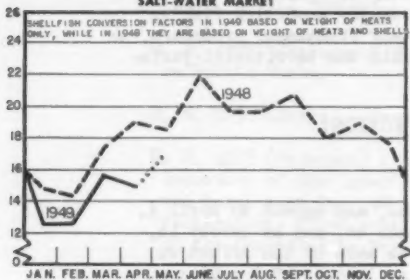
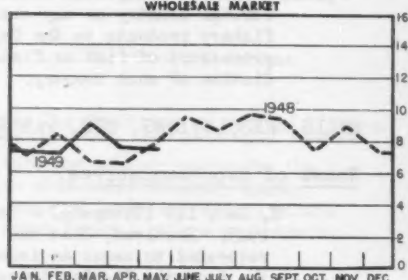
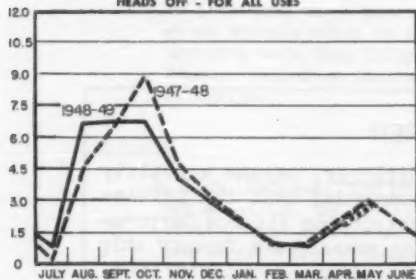
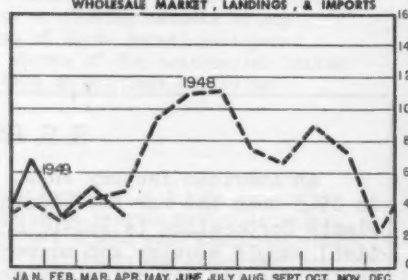
#### S. S. PACIFIC EXPLORER

An American factory ship, the Pacific Explorer, became a reality in 1945 when the War Food Administration recommended that the Defense Plants Corporation (a subsidiary of the Reconstruction Finance Corporation) should acquire and convert an ocean-going vessel to a factory ship to further the war effort by increasing the supplies of protein food. At the cessation of hostilities, the conversion of the ship was not completed, but various Governmental agencies decided that it would be to the advantage of the Government and the fishing industry to complete the conversion and to determine the feasibility of motherships to expand the scope of the American fishing effort.

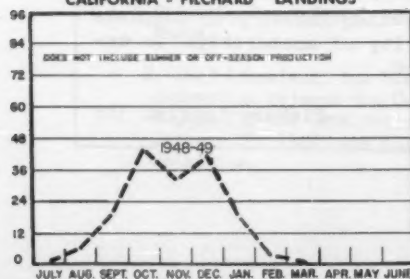
—Fishery Leaflet 316

## LANDINGS AND RECEIPTS

In Millions of Pounds

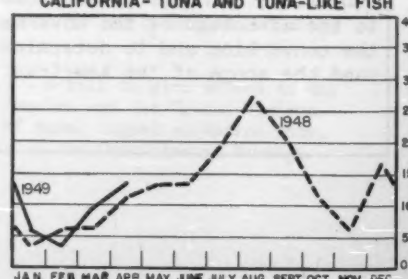
MAINE - LANDINGS  
NOT INCLUDING IMPORTSMASSACHUSETTS - LANDINGS  
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE CODNEW YORK CITY - RECEIPTS OF FRESH & FROZEN FISH  
SALT-WATER MARKETCHICAGO - RECEIPTS OF FRESH & FROZEN FISH  
WHOLESALE MARKETGULF - SHRIMP LANDINGS  
HEADS OFF - FOR ALL USESSEATTLE - RECEIPTS OF FRESH & FROZEN FISH  
WHOLESALE MARKET, LANDINGS, & IMPORTS

CALIFORNIA - PILCHARD LANDINGS



In Thousands of Tons

CALIFORNIA - TUNA AND TUNA-LIKE FISH

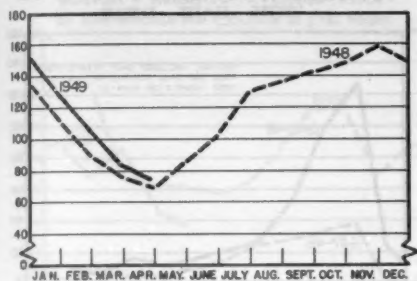


\*\*\*\*\* ESTIMATED

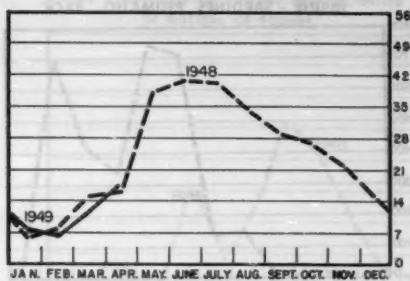
## COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

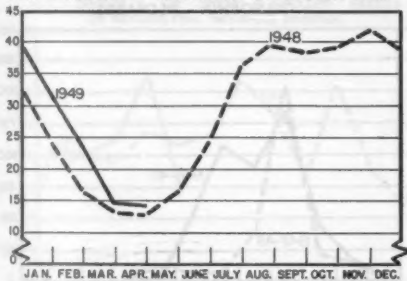
U.S. &amp; ALASKA - HOLDINGS OF FROZEN FISH



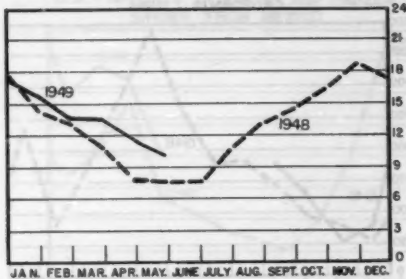
U.S. &amp; ALASKA - FREEZINGS



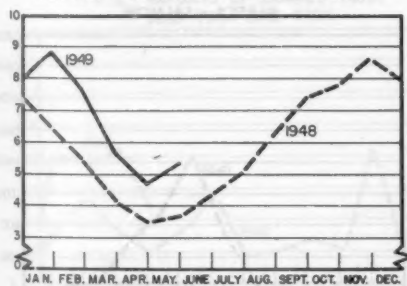
NEW ENGLAND - HOLDINGS OF FROZEN FISH



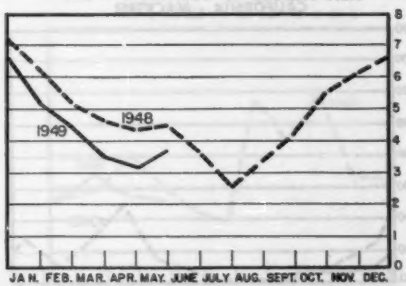
NEW YORK CITY - HOLDINGS OF FROZEN FISH



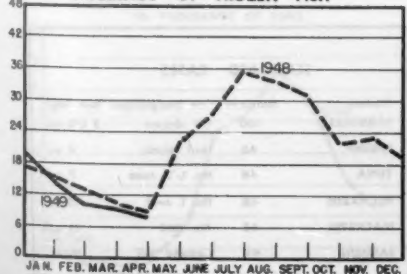
CHICAGO - HOLDINGS OF FROZEN FISH



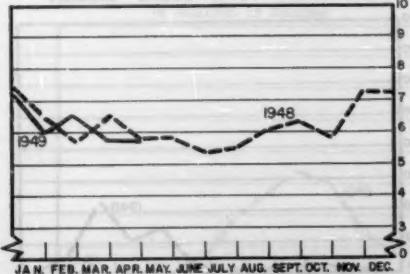
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



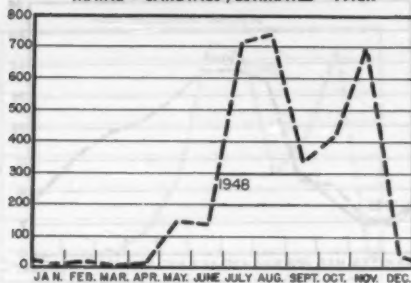
CALIFORNIA - HOLDINGS OF FROZEN FISH



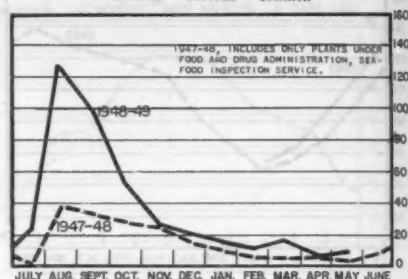
## CANNED FISHERY PRODUCTS

In Thousands of Standard Cases

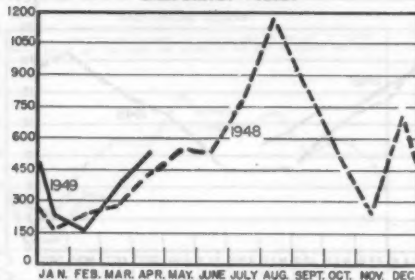
MAINE - SARDINES, ESTIMATED PACK



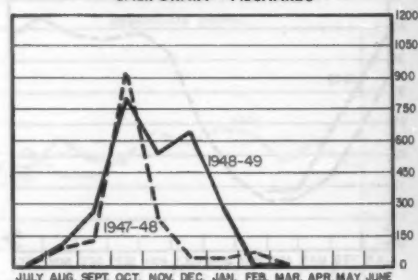
UNITED STATES - SHRIMP



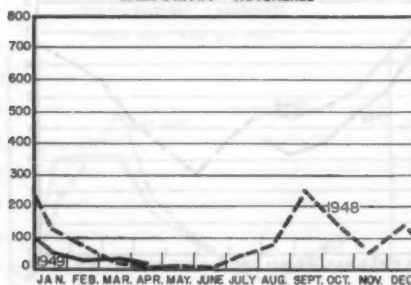
CALIFORNIA - TUNA



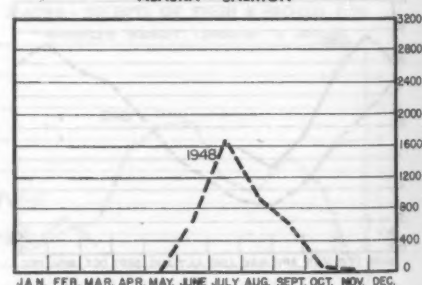
CALIFORNIA - PILCHARDS



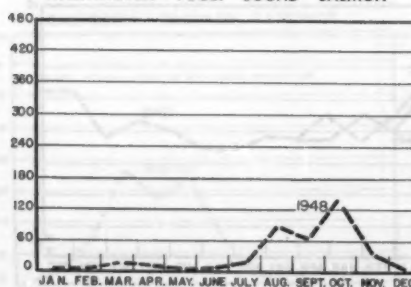
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON



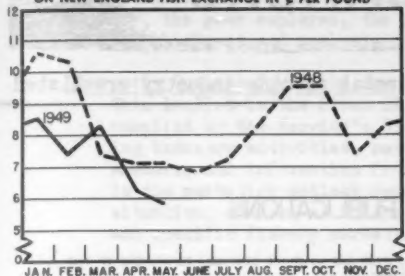
## STANDARD CASES

Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	No. 1 picnic	7 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

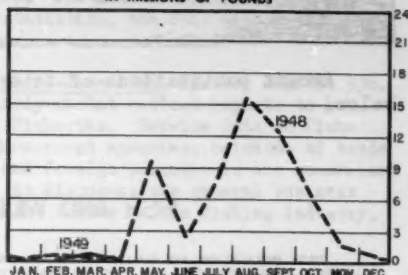


## PRICES, IMPORTS and BY-PRODUCTS

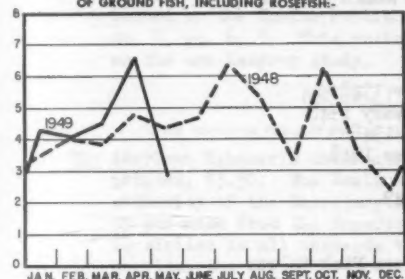
BOSTON - WEIGHTED AVERAGE PRICE  
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND



MAINE - IMPORTS OF FRESH SEA HERRING  
IN MILLIONS OF POUNDS

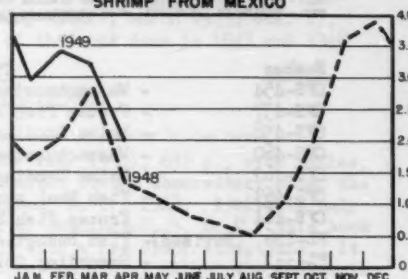


U.S. - IMPORTS OF FRESH & FROZEN FILLETS  
OF GROUND FISH, INCLUDING ROSEFISH.



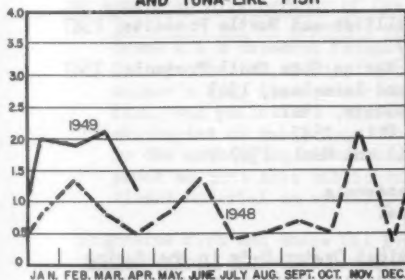
In Millions of Pounds

U.S. - IMPORTS OF FRESH AND FROZEN  
SHRIMP FROM MEXICO

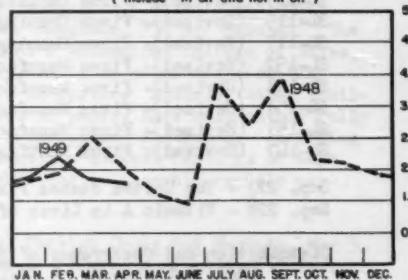


IN MILLIONS OF POUNDS

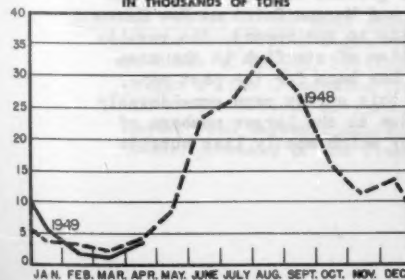
U.S. - IMPORTS OF CANNED TUNA  
AND TUNA-LIKE FISH



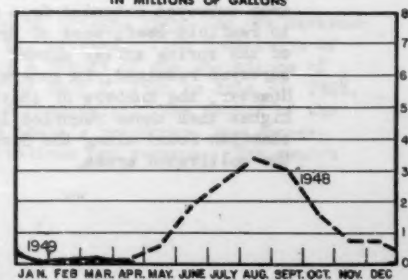
U.S. - IMPORTS OF CANNED SARDINES  
(Include in oil and not in oil)



U.S. & ALASKA - PRODUCTION OF FISH MEAL  
IN THOUSANDS OF TONS



U.S. & ALASKA - PRODUCTION OF FISH OIL  
IN MILLIONS OF GALLONS





# RECENT FISHERY PUBLICATIONS

Recent publications of interest to the commercial fishing industry are listed below.

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
FL - FISHERY LEAFLETS.  
NDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.  
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.  
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-454	- Massachusetts Landings, October 1948
CFS-457	- Frozen Fish Report, Annual Summary 1948
CFS-458	- Maine Landings, Annual Summary 1948
CFS-460	- Massachusetts Landings, November 1948
CFS-462	- Maine Landings, January 1949
CFS-463	- Fish Meal and Oil, February 1949
CFS-464	- Frozen Fish Report, April 1949
FL-126 (Revised)	- Fish Reduction Processes
FL-332	- Recording Color Changes in Frozen Pink Salmon
SL-107 (Revised)	- Firms Canning Miscellaneous Fish and Fish Products, 1947
SL-109 (Revised)	- Firms Canning Caviar and Miscellaneous Fish Roe, 1947
SL-110 (Revised)	- Firms Canning Oysters and Oyster Products, 1947
SL-113 (Revised)	- Firms Canning Crab Meat, 1947
SL-115 (Revised)	- Firms Canning Miscellaneous Shellfish and Turtle Products, 1947
SL-117 (Revised)	- Firms Canning Sea Herring, 1947
SL-152 (Revised)	- Firms Manufacturing Oyster and Marine Clam Shell Products, 1947
SL-153 (Revised)	- Firms Manufacturing Fish Glue and Isinglass, 1947
SL-154 (Revised)	- Firms Manufacturing Seaweed Products, 1947
SL-157 (Revised)	- Firms Manufacturing Fish Liver Oils, 1947
SL-160 (Revised)	- Firms Manufacturing Menhaden Oil and Meal, 1947

Sep. 227 - The United States Fishery Mission to Venezuela

Sep. 228 - Vitamin A in Liver of the Alaska Fur Seal

Distribution and Occurrence of Starfish on Connecticut Oyster Beds in the Spring of 1949, Bulletin No. 3, Vol. 13, April 18, 1949, 6 p., mimeographed, free. Available upon request from Fishery Biological Laboratory, Fish and Wildlife Service, Milford, Conn. Reports on the results of the spring survey of the distribution of starfish on Connecticut oyster grounds made in March. The area surveyed extended from about Morris Cove and Morgan Point at New Haven to Penfield Reef, west of Bridgeport. According to the report, the results of the spring survey showed that the distribution of starfish in the area surveyed remained, in general, the same as it has been for the past year. However, the numbers of starfish found during this survey were considerably higher than those recorded last fall, and is due to the larger numbers of starfish found along the deepest line of survey which mostly lies outside the cultivated areas.

The Production and the Fishing Methods of the Maine Herring Industry with Notes on the 1947 Season, by L. W. Scattergood, Special Scientific Report No. 67, 34 p., illus. with tables and figures, processed. Limited distribution. This report is a non-technical account of the production and fishing methods used by the Maine herring industry, the 1947 season, and the investigation of the herring fishery by the Service in cooperation with the Maine Sardine Packer's Association and the State of Maine's Department of Sea and Shore Fisheries. The author discusses the fishery, the gear employed, the need for adequate statistics, the 1947 season, and the establishment and analysis of statistical areas.

Quarterly Outlook for Marketing Fishery Products, April-June 1949, Fishery Leaflet 336.

This leaflet is the first of a series of quarterly market outlook reports to be compiled by the Service's Branch of Commercial Fisheries. Service data on fishing industry activities, material from other Government agencies, opinions of trade members, and information from varied domestic and foreign periodicals are summarized in the marketing outlook report. In addition, it discusses the general business situation, conditions in the food industry, recent trends in the fishing industry, and specific fishery marketing situations.

ARTICLES BY FISH AND WILDLIFE SERVICE AUTHORS IN OTHER PUBLICATIONS

"Progress Report on the Sea Lamprey Study," by John Van Oosten, The Fisherman (Published by the Marine Publishing Co., Grand Haven, Mich.), March 1949, vol. 17, no. 3, pp. 6, 9. This article gives a resume of the work done in 1947 and 1948 on the sea lamprey study.

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

The American Ephemeris and Nautical Almanac (For the Year 1950), 632 p., with tables, printed, \$3.50. The Nautical Almanac Office, United States Observatory under the authority of the Secretary of the Navy, Washington, D. C., 1948. Available only by purchase from the Superintendent of Documents, Washington 25, D. C. This book is similar in all respects to the one for 1949, with a few minor exceptions. It provides the navigator with a compact publication containing all of the ephemeris (astronomical) material essential to the solution of problems of navigational position.

An Annotated Bibliography of Oysters With Pertinent Material On Mussels and Other Shellfish and an Appendix on Pollution, by J. L. Baughman, 794 p., printed. The Texas A & M Research Foundation, The Agricultural & Mechanical College of Texas, College Station, Texas, 1948. The bibliography, built up originally for the author's use, lists numerous articles or papers on oysters, mussels, other shellfish, and pollution. Wherever possible articles or papers have been rather fully abstracted or taken from Chemical Abstracts and Biological Abstracts. According to the author, an effort has been made to present the salient features of each paper so that this bibliography would enable the user to assemble rapidly pertinent material on oysters, mussels, etc.

"Argentine Fish and Whale Oil Production," article, Foreign Crops and Markets, May 9, 1949, vol. 58, no. 19, pp. 457-8, free. Office of Foreign Agricultural Relations, U. S. Department of Agriculture, Washington 25, D. C. This article gives Argentine's 1948-49 production and marketing of whale oil, and the 1948 production and marketing of fish oil and shark liver oil.

Biennial Report of the Fish Commission of the State of Oregon, 1949, (to the Governor and the Forty-Fifth Legislative Assembly), 36 p., printed. Fish Commission of the State of Oregon, Portland, Oregon. This is a report of the operations of Oregon's Fish Commission for the biennial period July 1, 1946 to June 30, 1948, and of the various divisions which make up the Commission. The report of the Master Fish Warden discusses the value of the State's resources, the conservation problems of the fisheries, and appropriations and revenues. The report

of the Division of Research reviews the investigations of the Columbia River system; the production of salmon from the coastal rivers; studies of the albacore, pilchards, salmon, sharks, bottom fish, and shellfish; and hatchery biology. Also included are reports of the Division of Engineering, Division of Fish Culture, financial statements, and tables showing the salmon escapement over Bonneville Dam from 1938 to 1948 by species and by months.

Canadian Fishery Markets (Review and Outlook), Market Bulletin No. 2, January 1949, 35 p., processed. Department of Fisheries, Ottawa, Canada. This is the second in a series of Market Bulletins designed to review the current marketing of various forms of Canadian fishery products and to give an appraisal of the outlook in individual markets. This issue surveys the marketing of fishery products during 1949, and attempts to forecast the prospects for 1949. In addition to a summary of the marketing outlook for 1949 for Canadian fishery markets, this report contains a more detailed outlook of the domestic and export markets (including the United States market), and a market outlook for types of fishery products (fresh and frozen, canned, cured, and fish meal and oil).

"Computing Human Consumption of Fish," article, Fisheries Bulletin, March-April 1949, vol. II, no. 1, pp. 2-36. Food and Agriculture Organization of the United Nations, Washington, D. C. After some preliminary notes on the tabulation of fish consumption and consumption by continents, the article presents a formula for measuring fish consumption. According to the article, "the main purpose is to tabulate and compare some available consumption figures and to encourage the use of more uniform methods and more clearly defined concepts in future work on fish consumption statistics." In the tables which accompany the article, an attempt is made to tabulate, as concisely and conveniently as possible, data on the per capita consumption of fish for the countries on which information is available. The countries included are: 24 in North and Central America, 15 in Asia and Oceania, 9 in Africa, 13 in South America, and 24 in Europe.

Digest of International Developments, Foods and Related Agricultural Products, World Trade in Commodities, April 1949, vol. VII, parts 6, 7, and 8, no. 13, 4 p., processed. Office of International Trade, Department of Commerce, Washington 25, D. C. (Available by purchase only at 5 cents per copy from the U. S. Superintendent of Documents, Washington 25, D. C., or Department of Commerce Field Offices). In addition to data on other commodities, this leaflet contains information on fishery products. One section of this report gives the imports (quantity and value) of fishery products into major United States territories and possessions for 1948, together with a short discussion. Another section discusses the Norwegian canned fish exports for 1948 and covers brisling, small sild, kippered herring, anchovies, canned dressed crabs, etc.

"The Eastern Belted Kingfisher, Megasceryle alcyon alcyon (Linnaeus), in Relation to Fish Management," by J. Clark Salyer, II and Karl F. Lagler, reprint from Transactions of the American Fisheries Society, vol. 76 (1946), pp. 97-117, printed. According to this paper, the kingfisher is the most common and universally distributed bird predator of fish in Michigan. Its principal migration routes are along the Great Lakes shores. Nesting territories are established along streams and lake shores; they are usually larger in the former than in the latter. The kingfisher is diurnal in its feeding with three peaks of activity--morning, afternoon, and early evening. First feeding of fledgelings is on insects; this food is followed by crayfish, then by fish. Fish eaten average about 2.3 inches in length and at fish hatcheries are mostly the species being propagated. On natural waters the food consists mostly of non-food and non-game fishes and crayfish. Because of their feeding proclivities, it is undesirable to have kingfishers about fish hatcheries and rearing stations. At present, general control on natural waters is not biologically justified. This paper was a contribution from the Department of Zoology of the University of Michigan, and from the Institute for Fisheries Research of the Michigan Department of Conservation. Substantial financial aid was given this study by the Wildlife Management Institute (American Wildlife Institute) and by the Associated Fishing Tackle Manufacturers.



"Fishing Chart," No. 71, scale 1:500,000, showing the waters of the Gulf of Maine and Georges Banks. U. S. Coast and Geodetic Survey, Customs House, Boston, Mass., or may be purchased from any one of their chart sales agencies located in the principal seaport towns, 1949. This chart was designed especially to meet the needs of fishermen and fishing fleets operating in the Gulf of Maine and Georges Banks. The chart differs from the conventional nautical chart by portraying greater detail required by the fishermen in selecting desired water depths and bottom types. By its use, the fisherman is assisted in setting his trawl and making his run with assurance that the desired depth can be maintained. Of interest to owners of fathometers and others are special features of the chart showing an intensive and selection of soundings, depth curves, in continuous black lines at 5, 10, 15, 20, 40, 50, and 100 fathoms, and water tints in varying shades of blue to quickly show shoal water, together with notes indicating numerous bottom characteristics. Also, the location and names of fishing banks and areas are prominently shown, and Loran curves are printed on the reverse side.

Foreign Government Purchasing Missions and Agencies Under Government Supervision Functioning Under ECA-Financed Programs, 7 p., processed. Economic Cooperation Administration, Washington, D. C. This leaflet lists the name, address, and functions performed by each foreign government purchasing mission and agency under government supervision functioning under ECA-financed programs. This list was submitted by appropriate representatives of the participating countries. While most of the countries participating in the European Recovery Program follow the general practice of utilizing private channels of trade whenever possible, certain purchasing of commodities financed by ECA is done through foreign government purchasing missions or agencies under foreign supervision.

Handbook on the Trust Territory of the Pacific Islands, 319 p., illus., and map, printed, \$1.50. Office of the Chief of Naval Operations, United States Navy Department, Washington 25, D. C., 1948. (For sale by the U. S. Superintendent of Documents, Washington 25, D. C.) This book contains a comprehensive survey of the United States Trust Territory of the Pacific Islands, and especially of administrative policies and the activities in the postwar period, first under military government by the United States Navy, and then as a strategic trusteeship under naval administration. A small section gives data on the marine resources of the trust territory, together with a table showing the 1941 catch and production for the area. Included is a map showing the many islands which compose the trust territory. According to this report, among the marine products in this area which have commercial potentialities are bonito, tuna, mackerel, shark fins, trepang, pearls, pearl shells, sponges, and cowrie shells, all of which were exploited by the Japanese.

The Mexican Fisheries Industry, Foods and Related Agricultural Products, World Trade in Commodities, April 1949, vol. VII, parts 6, 7, and 8, No. 10, 4 p., printed. Office of International Trade, Department of Commerce, Washington 25, D. C. (Available by purchase only at 5 cents per copy from the U. S. Superintendent of Documents, Washington 25, D. C., or Department of Commerce Field Offices.) Based on a report from the United States Embassy at Mexico City, this publication gives a concise review of the Mexican fisheries. It discusses fishing areas, the tuna and shrimp fisheries, other fisheries, Pacific and east coast fishing ports, production data for 1941 through 1947, working conditions in the fisheries, fishing vessels, foreign trade, and outlook.

Newfoundland Fisheries Industry--United States Fish and Shellfish Trade with Mexico, Foods and Related Agricultural Products, World Trade in Commodities, January 1949, vol. VIII, parts 6, 7, and 8, no. 5. Office of International Trade, Department of Commerce, Washington, D. C. (For sale at 5 cents per copy by the Superintendent of Documents, Washington, D. C., or by Department of Commerce Field Offices.) The first part of this report deals with the Newfoundland fisheries industry and discusses the effects of Newfoundland's union with Canada upon the fisheries of both countries. It includes data on the Newfoundland cod, herring, seal, lobster, salmon, and squid fishery; and fish and whale oil industry. Most of the statistics are for 1947 and some are for the first part of 1948. The second part of the report deals with the United States fish and shell-

fish trade with Mexico for the first nine months in 1948 compared with the corresponding period in 1947. The data given includes exports (quantity and value) to Mexico by major categories, and imports (quantity and value) of fish and shellfish from Mexico by principal species. It concludes with a short discussion of the Mexican shrimp fishery.

Pacific Halibut Fishery Regulations, 1949 (Effective April 28, 1949), 10 p., printed. This publication is accompanied by "Memorandum on 1949 Pacific Halibut Fishery Regulations," 9 p., processed. International Fisheries Commission, University of Washington, Seattle, Wash. Gives the regulations of the International Fisheries Commission adopted pursuant to the Pacific Halibut Fishery Convention between the United States and the Dominion of Canada, signed January 29, 1937.

Pacific Marine Fisheries Commission, Bulletin 1, 64 p., with tables and figures, printed. Pacific Marine Fisheries Commission, Portland, Oregon, 1948. The first part of the publication contains the history and development of the Commission and includes the complete text of the tri-state (Washington, Oregon, and California) compact adopted in San Francisco at the Western Legislative Conference of the Council of State Governments on November 21, 1946. The second and major part of the booklet gives the coordinated plans for management of the fisheries of the Pacific Coast prepared by the Research Departments of California, Washington, and Oregon. It covers in detail the salmon, steelhead, otter trawl, tuna, crab, anchovy, sardine and pilchard, shad, striped bass, and oyster fisheries. In addition, it discusses the development of latent fisheries, statistics, hydrographic studies in oceanography, and recommendations for cooperative studies and coordinated management of the Pacific Coast fisheries.

The "Point Four" Program, A Progress Report, April 1949, no. 1, 9 p., processed. Division of Public Liaison, Office of Public Affairs, Department of State, Washington, D. C. This is the first of a series of Progress Reports on the Point Four Program designed to provide background information in summary form on developments in the President's program for world economic progress through cooperative technical assistance. According to the report, economic development means the development of productive resources, and included among the specific areas where the widespread improvement of techniques would be expected to contribute importantly to the productivity of these resources is natural resources, which includes forest and fisheries management.

Preliminary Survey of the Fresh-water Fisheries of Nigeria, by J. B. Welman, 71 p., illus., printed. The Government Printer, Lagos, Nigeria, 1948. A record of the results of an independent examination of the fresh-water fisheries of Nigeria carried out by the author in spare time during the last ten years (1929-38) of his service as an administrative official in Nigeria. Included are chapters on the fish and their economic value, natural causes of depletion of the fisheries, depletion from unrestricted fishing, and means of conservation. The book concludes with a list of Nigerian fresh-water fishes, with keys to the families and principal species, and native names of fishes.

"Report on Trawling Surveys on the Patagonian Continental Shelf," by Dr. T. John Hart, Discovery Reports (Issued by the Discovery Committee, Colonial Office, London, on behalf of the Government of the Dependencies of Falkland Islands), vol. 23, pp. 223-408. University Press, Cambridge, England, approx. \$7.00. Throughout the whole of the cold-temperate (sub-Antarctic) zone of the southern hemisphere the waters overlying the Patagonian Continental Shelf provide the largest expanse of sea shallow enough to support a considerable population of commercial fishes, according to this recently issued report. During the years 1927, 1928, and 1931-32 the Discovery Committee's research vessel, William Scoresby, carried out three trawling surveys of this region between latitudes 42° S. and 52° S. The primary object of the investigations was to provide information upon which the prospects of carrying on a commercial fishery from the Falkland Islands could be assessed. The results of these surveys are contained in this report. The surveys were actually conducted by the late E. R. Gunther and this report was written up mainly from manuscripts left by Gunther. The first part of the report is devoted to the general topography of the Patagonian Continental Shelf which stretches

from the River Plate in the north to Staten Island in the south, and extends offshore to an average distance of some 200 miles to the eastward. The second and larger part of the report deals mainly with the demersal fish. It was found that the Patagonian Shelf is notably poorer in species than are comparable areas elsewhere. A true hake (*Merluccius hubbsi*) and the "long-tailed hake" (*Macruronus magellanicus*), were dominant among the larger fishes; and particular attention is devoted to them in the report, which deals in a detailed manner with the relative sizes of Patagonian and European hake, the distribution and relative abundance, the relationship between length and weight and its value as an indicator of the spawning season, food and feeding, and the effect of latitude on numbers, size and sex ratio. The principal conclusion of the report is that, although the shelf is not very rich in trawlable fish, hake and other edible species are present in moderate numbers. Unfortunately, the best trawling grounds are not very near the Falkland Islands. However, the report shows quite clearly that, on the shelf to the northward, roughly equidistant from the Falkland Islands and the lesser Argentine ports, there is a stock of hake just sufficient to enable a modern trawler to pay its way if there were markets within a few hundred miles.

"Review of Recent World Fisheries Activities," article, *Fisheries Bulletin*, March-April 1949, vol. II, no. 1, pp. 37-48. Food and Agriculture Organization of the United Nations, Washington, D. C. Tentative end-of-year 1948 fisheries reports for Canada, Finland, Iceland, Ireland, Newfoundland, Norway, the United Kingdom and the United States are contained in this article.

Second Biennial Report, 1946-47, 352 p., illus., printed. Department of Wild Life and Fisheries, New Orleans, La., 1948. A portion of this publication contains the reports of the Louisiana Fish and Game Division and the Oysters and Water Bottoms Division. Data on the fisheries of Louisiana are given for 1946 and 1947. Included is the production and valuation of fresh- and salt-water fishes, and production of salt-water shrimp and oysters. It also gives reports on the oyster investigations, shrimp researches, development of the crab fishery in Louisiana, and control of the water hyacinth.

"Sedentary Fish and the Doctrine of *Toomer v. Witsell*" (A memorandum to the Commissioners), by F. L. Zimmersmann, 2 p., mimeo. Atlantic States Marine Fisheries Commission, New York, N. Y., January 1949. This memorandum discusses the importance of state proprietorship in the management of sedentary fish, and suggests that the interstate fishery commissions and the state governments on all three coasts should be prepared to intervene in any case that may be raised on this issue so that the issues may be clearly placed before the Court. Three points that should be stressed in any Court case by the interstate commissions and the states involved are presented.

"Shellfish Sanitation in Virginia," article, *Virginia Health Bulletin*, January 1949, vol. 1, series 2, no. 9, pp. 3-11, 13-14, illus. Virginia State Board of Health, State Department of Health, Richmond, Va. The entire issue of this Bulletin is devoted to the Virginia shellfish sanitation program. It discusses how the State Health Department, through its Bureau of Shellfish Sanitation, makes sanitary and bacteriological surveys of all shellfish growing areas and classifies such waters as approved or restricted; and the sanitary precepts that have been established by the State for the control of harvesting and processing seafoods.

"The Story of the Maine Clam (*Mya arenaria*)", by R. L. Dow and D. E. Wallace, 20 p., illus., printed, free. Department of Sea and Shore Fisheries, Augusta, Maine, 1948. This bulletin is a short summary of the Maine soft clam fishery. It discusses the economic history, anatomy, biology, and environment of the Maine or soft clam. It concludes with a history of conservation and present program for Maine's clam fishery.

Technical & Scientific Cooperation, February 1949, 16 p., processed. Office of Public Affairs, Department of State, Washington, D. C. Reports on the educational and cultural projects coordinated by the Interdepartmental Committee on Scientific and Cultural Cooperation in 1948. Included under fishery and wildlife resources are fishery development projects in which the Fish and Wildlife Service cooperated. These included studies in fish preservation and processing, experimental fishing, and marine, biological and oceanographic investigations.

Transactions of the American Fisheries Society, 1946 (Seventy-Sixth Annual Meeting, St. Paul, Minnesota, September 11-13, 1946, vol. 76, 473 p., printed. American Fisheries Society, Ann Arbor, Mich., 1949. Part I consists of the papers presented at the Seventy-Sixth Annual Meeting of the Society. Included are the following papers relating to commercial fisheries: "Fishery Conservation Through Education;" "Trends in the Lake Trout of Fishery of Lake Huron through 1946;" "Recent Investigations on the Sea Lamprey, *Petromyzon marinus*, in Ontario;" "The Age, Growth and Distribution of the Longjaw Cisco, *Leucichthys alpenae* Koelz, in Lake Michigan;" "Cooperative Fishery Survey of the Upper Mississippi River;" and "A Definition of Depletion of Fish Stocks." Part II is a report of the Symposium (Missouri River Basin--Flood Control, Navigation, and Irrigation and Their Relation of Fish and Game). Part III reports on the business sessions of the Society.

United States Foreign Trade in Fish and Fish Products, by George A. Salles and Maurice W. Wallar, Foods and Related Agricultural Products, World Trade in Commodities, April 1949, vol. VII, parts 6, 7, and 8, no. 14, 16 p., processed. Office of International Trade, Department of Commerce, Washington 25, D. C. (Available by purchase only at 5 cents per copy from the U. S. Superintendent of Documents, Washington 25, D. C., or Department of Commerce Field Offices.) A summary of the United States foreign trade in fishery products is given in this report, together with tables. It includes exports and imports data for 1945 through 1948 (including the 1934-38 average for exports data) as well as a table showing a value index for imports and exports of fishery products for 1945 through 1948. These data are then broken down further into fresh and frozen fish and shellfish by leading species; canned fish and shellfish by leading species; and cured, salted, pickled, or dry-cured fish and shellfish. In addition, a short resume of the world fish catch and the United States fish and shellfish production is also included.

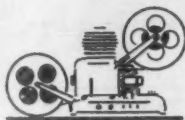
United States Trade With European Recovery Program Countries, International Reference Service, February 1949, vol. VI, no. 5, 44 p., processed. Office of International Trade, U. S. Department of Commerce, Washington, D. C. The first part of this publication consists of background information regarding the European Recovery Program, and imports and exports with European countries. The statistical tables constituting the main portion of this report contain a wide range of information for prewar and postwar periods on the trade of the United States with the ERP area. They may be subdivided into three main groups: (1) Total trade with the whole area, including dependencies, broken down by individual countries and dependencies; (2) economic-class and commodity-group data, including export-group data for the ERP area (excluding dependencies), and imports by economic classes from the participating countries and from dependent areas without details for individual countries or dependencies; (3) trade with each country (excluding dependencies) showing the commodity distribution of the trade prewar and postwar. For the import trade a further table is included showing the semimanufactures and manufactures imported from Europe as a whole, but comprising commodities normally furnished largely by ERP countries, in 1937 and the first quarter of 1948, to provide a comparison between the position of European-ECA countries as a supplier in a prewar year and in the postwar period immediately preceding the passage of the Economic Cooperation Act. Most



of the tables include data for 1938, 1946, 1947 and January-June 1948. Under the general heading of foodstuffs, fishery products are listed in the tables under the two general headings of "fish and fish products" and "animal and fish oils, inedible."

What About Fish? (Selection, Food Value, and Basic Cooking Methods), by Hilda Faust and Vera Greaves Mrak, Circular 144, 12 p., illus., printed. The College of Agriculture, California Agricultural Extension Service, University of California, Berkeley, Calif., November 1948. Presents a few simple facts about fish cookery. This circular discusses nutritive value, buying fish, preparing fish, gives basic recipes for cooking fish, and gives several recipes for fish sauces.

"World Production of Fish Oils Decreases," article, Foreign Crops and Markets, May 9, 1949, vol. 58, no. 19, pp. 447-51, free. Office of Foreign Agricultural Relations, U. S. Department of Agriculture, Washington, D. C. This article discusses the 1948 world production of fish oils, not including whale oil, in general and by countries (United States, Norway, Iceland, Canada, Japan, Newfoundland, the United Kingdom, Portugal, Argentina, Brazil, Spain, the Netherlands, Belgium, Italy, Union of South Africa, Angola, Australia, and the Soviet Union). A table is given showing the estimated production by specified countries for the years 1945 through 1948 and the average for 1935-39.



#### FISHERY MOTION PICTURES

The following motion pictures are available only from the source given in each listing.



Pacific Halibut Fishing, 16 mm, color and sound, 12 minutes. Produced by the Fish and Wildlife Service, May 1949. This new film follows a typical Seattle halibut schooner on a voyage to the halibut fishing grounds in the Gulf of Alaska, and demonstrates the long-line method used for commercial halibut fishing. It is intended for general showings to such audiences as trade groups, women's organizations, schools, etc. Can be borrowed from the DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. (Because the number of prints is limited, requests for booking the film should be made as far in advance as possible. Requests will be handled in order of receipt. Each request should indicate clearly the address to which the shipment is to be made. Shipments are usually made by express, the borrower paying transportation charges both ways, but there is no charge for the use of the film.)




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## EXPERIMENTAL FISHING TRIP TO BERING SEA

Fishery Leaflet 330, "Experimental Fishing Trip to Bering Sea," is a report of the experimental fishing trip in Bering Sea made by the Alaska in 1947. The purpose of the trip was to gather data pertaining to the size, distribution, and abundance of the king crab and bottom fish. This same report, without the appendix, appeared in the January 1949 issue of Commercial Fisheries Review.



THE ALASKA TIED UP AT THE DOCK AT FALSE PASS, ALASKA

degrees Centigrade taken in the fishing grounds; and list of fishes collected or observed in the Bering Sea.

Copies of Fishery Leaflet 330 may be obtained upon request, without charge, from the U. S. Fish and Wildlife Service, Washington 25, D. C.

The appendix of this 13-page leaflet contains detailed tables giving data recorded for each drag made in Bering Sea and south of the Alaska Peninsula; catch for each drag in actual numbers of crab and halibut and estimated pounds of cod, pollock, and flounders; weight distribution of male and size distribution of male and female crabs, halibut, cod, pollock, yellowfin sole, flathead sole, rock sole, lemon sole, and herring; air, water surface and bottom temperatures in

128D Michigan.

Ann Arbor.

University of Michigan General Library.

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